

THE FAMILY SERGESTIDAE IN THE WATERS AROUND SOUTHERN AFRICA (CRUSTACEA, DECAPODA, NATANTIA)

By

BRIAN F. KENSLEY

South African Museum, Cape Town

(With 24 figures)

[MS. accepted 20 January 1971]

CONTENTS

	PAGE
Introduction	215
List of species	217
Key to genera and subgenera	217
Description of material	219
Discussion	262
Summary	263
Acknowledgements	263
References	263

INTRODUCTION

The family Sergestidae is represented in the waters around southern Africa by three genera of the subfamily Sergestinae, viz. *Sergestes*, *Petalidium* and *Aceles*, and by one genus viz. *Lucifer* in the subfamily Luciferinae. Literature concerning these southern African representatives is very poor. Regarding the genus *Sergestes*, both Hansen (1925) and Barnard (1950) reported on five species. The distribution of these five species was touched on briefly by Grindley & Penrith (1965), while Kensley (1968) added four species to the South African list. Barnard (1950) dealt with *Aceles erythraeus* and in 1955 described another species of the same genus, while in his former paper he discussed one species of *Lucifer*.

In this present paper almost all the available material has been examined. This material comes from several sources. The material collected at the start of this century by the S.S. *Pieter Faure* has been examined. The whereabouts of the material collected by the S.S. *Pickle* in the 1920s are unknown. A fair number of specimens were obtained in 1959 when the Division of Sea Fisheries research ship *Africana II* did a series of deep trawls off Cape Point. All this material is housed in the South African Museum. From 1960 to 1963 the South African Museum undertook a survey of the bathypelagic fauna around South Africa using the S.A.S. *Natal*. A preliminary report of this survey was published by Grindley & Penrith (1965). Again, this material is housed in the South African Museum. The Division of Sea Fisheries has made extensive collections from 1961 to 1966, from off Moçambique and southern Malagasy on the east, to the Walvis Basin on the west. This large collection has also been examined.

The Oceanography Department of the University of Cape Town has over the years 1958–65 made extensive plankton collections off the southern African coasts. All the specimens of *Lucifer* in these collections, which include those of the National Geophysical Year collected by the S.A.S. *Natal* in 1958, the International Indian Ocean Expedition, also collected by the S.A.S. *Natal* in 1962 and 1963, and those of the *John D. Gilchrist* collections have been examined.

The data for the stations given in the discussions of the individual species may be obtained from the various sources listed below.

1. Stations designated by 'A' followed by three digits e.g. A321, denote 'Africana' stations off Cape Point. Data obtainable from Kensley (1968).
2. Stations designated by 'A' followed by four digits e.g. A1231, denote 'Africana' Stations. A1138–A1148 are obtainable from the *Annual Report* of the Director of the Division of Sea Fisheries for the year April, 1960–March, 1961. A1224–A4229, carried out between 1961 and 1966 are as yet unpublished.
3. Stations GIL 54–85 (*John D. Gilchrist*) are obtainable from the *Publication* No. 7 of the Oceanography Department of the University of Cape Town. Stations GIL 254–566 are obtainable from *Data Report* No. 3 of the Oceanography Department of the University of Cape Town.
4. Stations designated NGY (National Geophysical Year) are obtainable from *Publication* No. 1 of the Oceanography Department of the University of Cape Town.
5. Stations designated by NIOE (National Indian Ocean Expedition) stations 1–178 are obtainable from *Data Report* No. 2 of the Institute of Oceanography of the University of Cape Town.
Stations NIOE 200–215 are obtainable from *Data Report* No. 3 of the Institute of Oceanography of the University of Cape Town.
6. Stations designated IK denote South African Museum Isaacs-Kidd bathypelagic survey. Station data are obtainable from Grindley & Penrith (1965).

Abbreviations used in figures

- la—lobus armatus
- l.ac—lobus accessorius
- lc—lobus connectens
- li—lobus inermis
- lt—lobus terminalis
- pu—processus uncifer
- pv—processus ventralis

Fairly full descriptions have been given in four cases, all of which are species erected by Burkenroad in 1940. All four species were described from *Dana* Expedition material, and only preliminary descriptions have so far been published. Comparison of the present material with the *Dana* type material

sent on loan through the kind offices of Dr. Torben Wolff of Copenhagen, and Dr. A. A. Racek of Sydney has confirmed the identifications.

Finally, in all cases where the carapace length of a specimen is given, this has been measured from the base of the rostrum (i.e. at base of eyestalk) to the mid-dorsal point of the posterior carapace margin.

LIST OF SPECIES

Subfamily **Luciferinae**

Lucifer chacei Bowman

Lucifer orientalis Hansen

Lucifer penicillifer Hansen

Lucifer typus H. Milne Edwards

Subfamily **Sergestinae**

Acetes erythraeus Nobili

Acetes natalensis Barnard

Sergestes (*Sergestes*) *arcticus* Kröyer

Sergestes (*Sergestes*) *armatus* Kröyer

Sergestes (*Sergestes*) *atlanticus* H. Milne Edwards

Sergestes (*Sergestes*) *corniculum* Kröyer

Sergestes (*Sergestes*) *disjunctus* Burkenroad

Sergestes (*Sergestes*) *orientalis* Hansen

Sergestes (*Sergestes*) *pectinatus* Sund

Sergestes (*Sergestes*) *sargassi* Ortmann

Sergestes (*Sergia*) *creber* Burkenroad

Sergestes (*Sergia*) *grandis* Sund

Sergestes (*Sergia*) *laminatus* Burkenroad

Sergestes (*Sergia*) *prehensilis* Bate

Sergestes (*Sergia*) *potens* Burkenroad

Sergestes (*Sergia*) *regalis* Gordon

Sergestes (*Sergia*) *scintillans* Burkenroad

Sergestes (*Sergia*) *splendens* Sund

Petalidium foliaceum Bate

KEY TO GENERA AND SUBGENERA

1. Body strongly compressed, lacking gills, planktonic *Lucifer*
- Body not strongly compressed, gills present 2
2. Last two pairs pereopods absent *Acetes*
- Last two pairs pereopods present 3
3. Gills present above fourth pereopods 4 (*Sergestes*)
- Gills absent or rudimentary above fourth pereopods *Petalidium*
4. No dermal photophores present.
 - Organs of Pesta present (luminescent modifications of gastro-hepatic gland) *Sergestes* (*Sergestes*)
 - Dermal photophores often present.
 - Organs of Pesta absent *Sergestes* (*Sergia*)

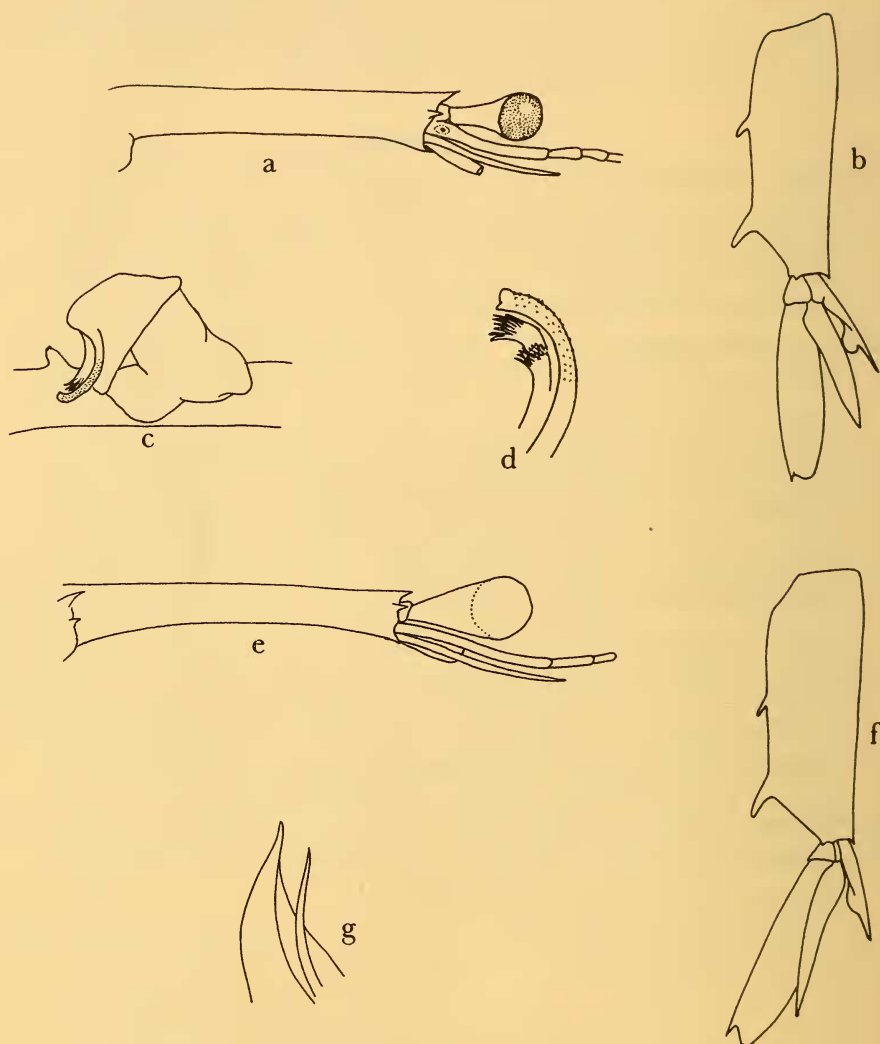


FIG. 1. *Lucifer penicillifer*

a. Anterior region; b. Male, 6th abdominal segment, telson and uropod;
 c. Petasma, *in situ*; d. Apex of petasma.

Lucifer chacei

e. Anterior region; f. Male, 6th abdominal segment, telson, and uropod; g. Apex of petasma.

DESCRIPTION OF MATERIAL

Subfamily **Luciferinae**

Genus LUCIFER

Pelagic forms, rostrum short, spiniform. Carapace strongly compressed. Region between bases of eyes and antennae, and mouthparts elongate. Antennule lacking lower flagellum in both sexes. Third maxilliped and first three pereopods slender, elongate, first and second pereopods non-chelate, third pereopods imperfectly chelate. Fourth and fifth pereopods lacking. Gills entirely absent. Sixth abdominal segment in male with two ventral processes, unarmed in female. Telson in male with ventral process, female lacking process. Single genital opening in both sexes.

Key to known southern African species

1. Eyestalk less than half distance between bases of eyes and labrum 2
- Eyestalk more than half distance between bases of eyes and labrum 3
2. Petasma terminally expanded, processus ventralis brush-like *penicillifer*
- Petasma terminally acute, with needle-like processus ventralis *chacei*
3. Telson in male with ventral process some distance from apex.
 Petasma with processus ventralis having transverse area between two horns *typus*
- Telson in male with ventral process ending at apex.
 Petasma with processus ventralis lacking transverse area between two
 horns *orientalis*

Lucifer chacei Bowman, 1967

Fig. 1e-g

Lucifer chacei Bowman, 1967: 266, figs 1, 2a-b, 3a-c, 4.

Lucifer faxoni (non Borradaile) Hansen, 1919: 61, pl. 5, figs 3a-i. Chace, 1955: 4.

Description: Eye plus eyestalk about two fifths length of distance between eyestalk base and labrum. Basal antennular segment reaching to end of cornea in female, somewhat beyond cornea in male. Sixth abdominal segment in male with short straight anterior process, posterior process slender, curved. Spine on outer margin of outer uropod ramus reaching to apex of appendage in female, not quite reaching apex in male. Process on anterior margin of first pleopod in male longer than broad. Petasma with terminal portion curved, apically acute, processus ventralis slender, needle-like.

Distribution: East Indies, Pacific.

South African stations: A1231, A1232.

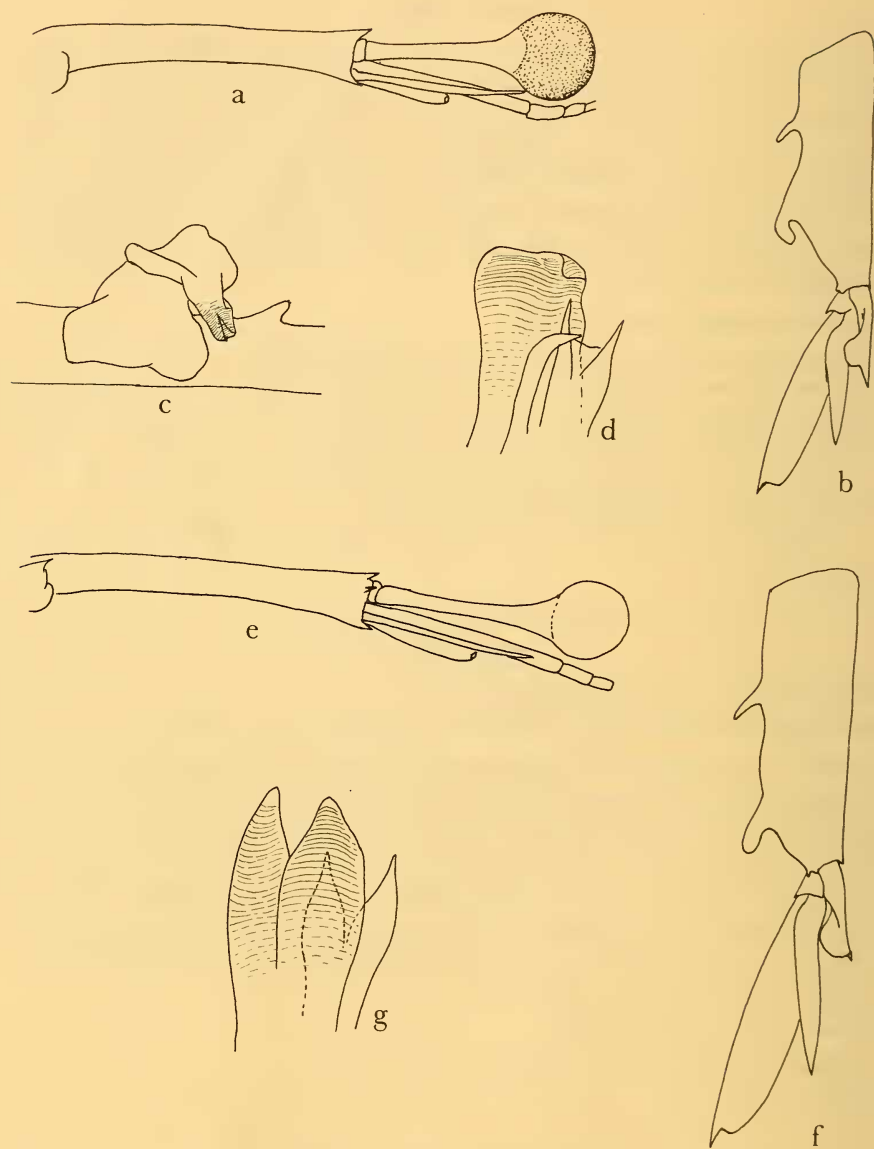
Material: 4 ♀♀, 1 ♂.

Lucifer orientalis Hansen, 1919

Fig. 2e-g

Lucifer orientalis Hansen, 1919: 55, pl. 4, fig. 7. Gordon, 1956: 325.

Description: Eye plus eyestalk slightly shorter than distance between eyestalk base and labrum. First antennular peduncle segment reaching to edge of

FIG. 2. *Lucifer typus*

a. Anterior region; b. Male, 6th abdominal segment, telson and uropod;
 c. Petasma *in situ*; d. Apex of petasma.

Lucifer orientalis

e. Anterior region; f. Male, 6th abdominal segment, telson and uropod; g. Apex of petasma.

cornea. Sixth abdominal segment in male with anterior process curved, apically acute. Posterior process distally expanded, slightly flexed. Telson in male short, rounded ventral process ending distally at apex. Spine on outer margin of outer uropod ramus extending well beyond apex. Petasma with sheath consisting distally of two pointed lobes, with transverse lines on outer surface, covering the processus ventralis. Latter consisting of two diverging pointed lobes.

Distribution: East Indies, off Philippines, Red Sea.

South African stations: A1239, GIL144, GIL239, NGY3, NGY4, NGY6, NGY7, NGY10, NGY12, NGY15, NGY16, NGY19, NGY21, NGY24, NGY27, NGY46, NGY50.

Remarks: Hansen (1919) remarks that the females of the closely related species *L. typus* and *L. orientalis* are very difficult to distinguish; this is certainly the case in the present material; consequently where the two species have occurred in the same sample, only the males of *L. orientalis* have been separated.

Lucifer penicillifer Hansen, 1919

Fig. 1a-d

Lucifer penicillifer Hansen, 1919: 59, pl. 5, fig. 2. Barnard, 1947: 384; 1950: 645, fig. 121. Gordon, 1956: 32, figs 4-6.

Lucifer typus (non Milne Edwards) Stebbing, 1914a: 28.

Description: Length of eye about one third that of distance between base of eyestalk and labrum. First antennular peduncle segment extending slightly beyond eye. Sixth abdominal segment in male with two ventral processes, the posterior one the larger, the apex acutely rounded. Telson in male with the rounded ventral process some distance from the apex, bearing numerous tiny granules. Tooth on outer margin of outer uropod ramus not extending beyond apex. Petasma with strongly chitonized sheath, the outer convex portion of which bears numerous tiny spines, the apex slightly expanded. Processus ventralis slender ending in a bipartite 'brush'.

Distribution: East Indies, Bay of Bengal, China Sea, off Great Barrier Reef.

South African locality: Mossel Bay.

South African stations:

'Africana'	GIL	NGY		NIOE
A1225	54	2	50	1
A1226	60	3	59	2
A1227	63	7	71	35
A1228	64	8	73	58
A1231	65	9	75	73
A1232	67	11	77	74
A1897	76	12	78	75

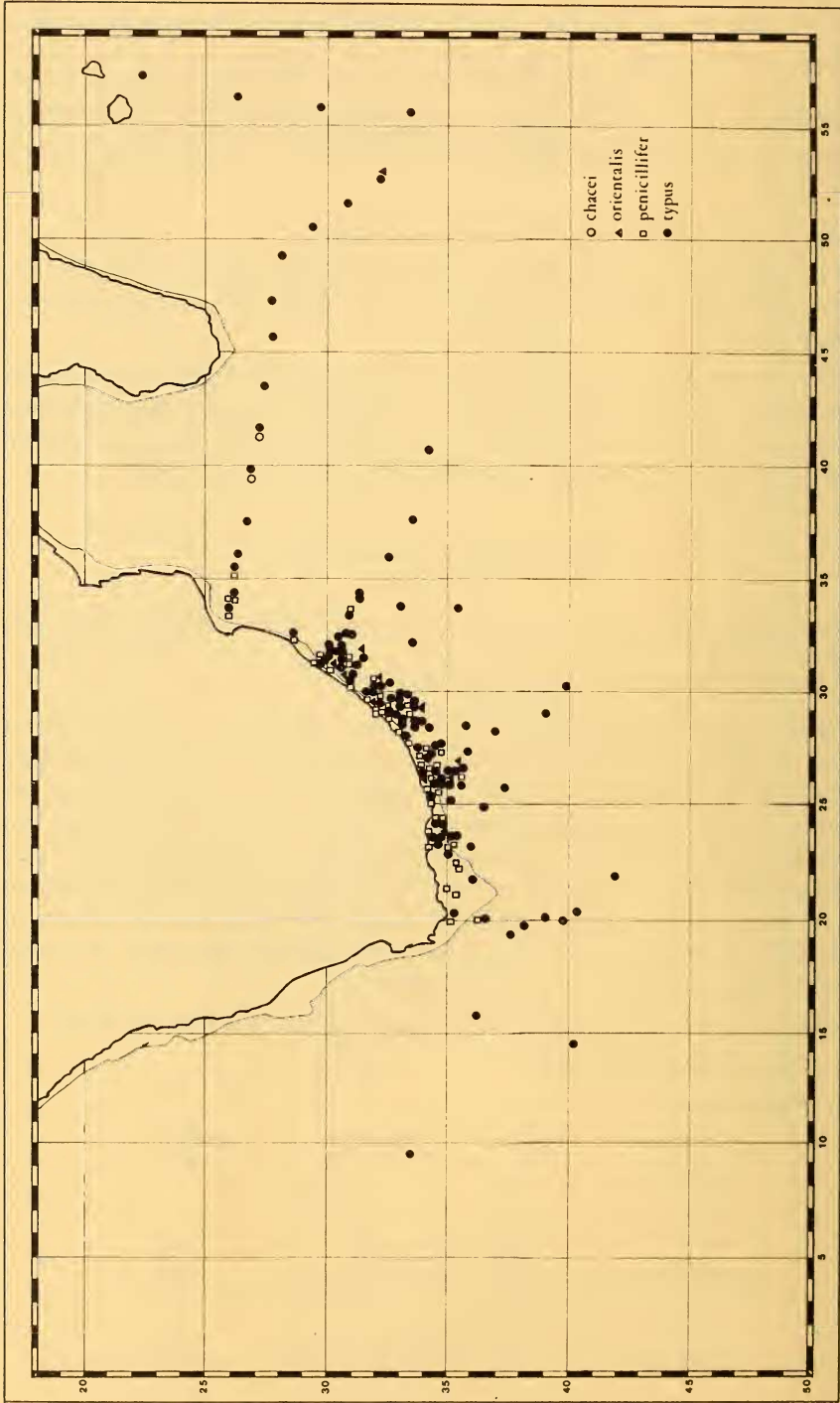


FIG. 3. Map showing distribution of the genus *Lucifer* around southern Africa

'Africana'	GIL	NGY	NIOE
A2386	77	16 79	77
	83	17 81	85
	86	19 83	92
	87	25 89	93
	88	26 90	95
	143	29	114
	169	30	159
	330	34	161
	254	37	176
	281	38	177
		41	200
		47	201
		48	205
		49	210

Remarks: *L. penicillifer* is the only species hitherto recorded from South African waters. It was collected by the *Pieter Faure* from Mossel Bay.

Lucifer typus H. Milne Edwards, 1837

Fig. 2a-d

Lucifer typus H. Milne Edwards, 1837: 469. Hansen, 1919: 53, pl. 4, fig. 6. Gordon, 1956: 324, figs 1-3. Bowman & McCain, 1967: 660, fig. 1a-b.

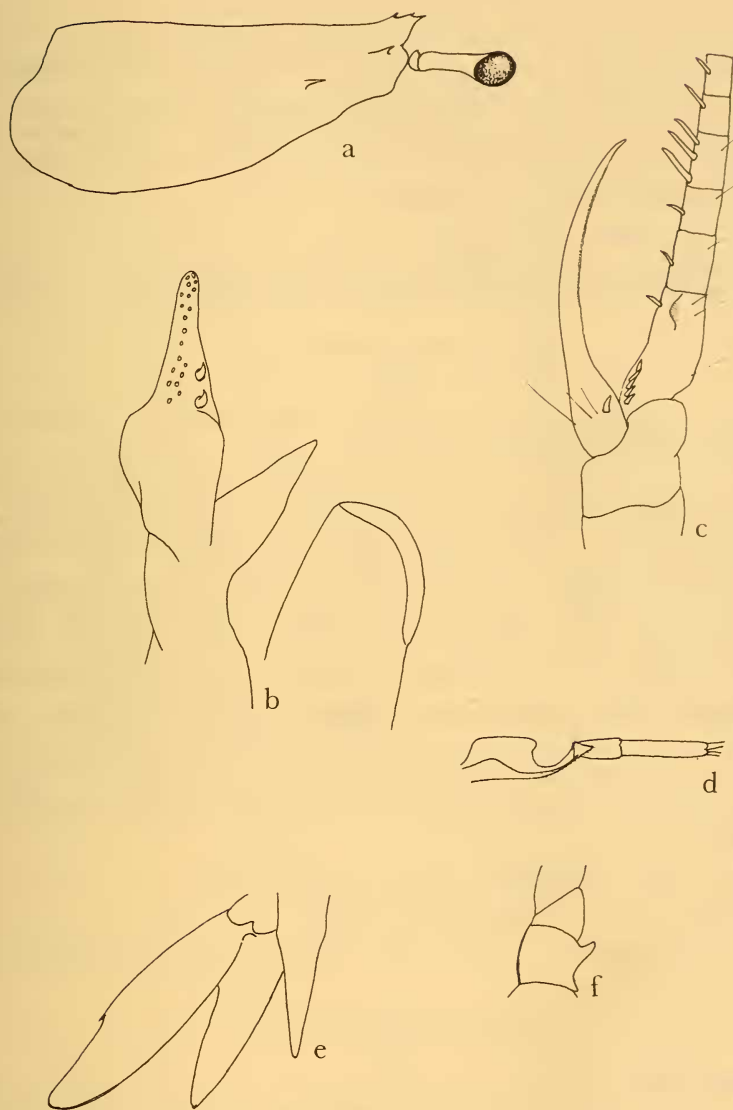
Description: Length of eye plus eyestalk less than the distance between eyestalk base and labrum. First antennular peduncle segment reaching to edge of cornea. Sixth abdominal segment in male with anterior process slender, acute. Posterior process distally expanded and bent. Ventral rounded process of telson in male some distance from apex. Spine on outer margin of outer uropod ramus extending well beyond apex. Petasma with terminal portion robust, sheath apically blunt. Sheath with transverse lines on outer surface, enclosing the broad processus ventralis and a strong hooked process. Processus ventralis with two terminal spines separated by a straight edge.

Distribution: Off Atlantic coast of North America, Sargassum Sea, East Indies, Bay of Bengal, Philippines, off Great Barrier Reef.

South African stations:

'Africana'	GIL	NGY	NIOE
A1225	54	1 60	2
A1227	60	2 62	3
A1228	61	3 65	4
A1229	64	4 68	5
A1230	65	5 69	7
A1231	77	6 70	12
A1232	85	7 72	21

<i>'Africana'</i>	GIL	NGY	NIOE
A1233	86	8 75	34
A1234	87	9 74	35
A1235	121	10 76	59
A1236	144	11 77	60
A1237	184	12 79	61
A1238	183	13 80	62
A1239	206	14 81	74
A1241	254	15 83	80
A1242	285	16 85	90
A1243	286	17 86	97
A1244		18 87	98
A1252		19 89	114
A1253		20 90	128
A1254		21	142
A1896		22	143
A1897		23	145
A2386		24	155
A2387		25	156
A2389		26	157
A2390		27	158
A2391		28	159
A2961		29	164
A2966		30	170
A3633		31	173
A3634		32	175
A3645		34	177
		35	200
		36	201
		37	204
		38	205
		39	206
		40	207
		41	210
		42	215
		43	
		44	
		45	
		46	
		47	
		48	
		49	
		50	
		59	


 FIG. 4. *Aceles erythraeus*

a. Carapace in lateral view; b. Petasma; c. Male, outer antennular flagellum;
 d. Antennular peduncle in lateral view; e. Telson and uropod in dorsal view;
 f. Female, coxa pereiopod three.

Subfamily **Sergestinae**Genus **ACETES**

Rostrum short, with one or more dorsal denticles, strong supraorbital and hepatic spines present. Third antennular peduncle segment in female slightly longer than second joint, very much longer in male. Lower antennular flagellum in male with clasping organ. Third maxilliped slender, elongate, shorter than third pereopod. Two distal joints of pereopod undivided. First pereopod with small chela. Pereiopods four and five entirely lacking. Petasma lacking the numerous ramifications found in *Sergestes*.

Key to the known southern African species

1. Telson apically acute, reaching beyond midpoint of inner uropod ramus . . . *erythraeus*
 —. Telson apically truncate, not reaching midpoint of inner uropod ramus . . . *natalensis*

Acetes erythraeus Nobili, 1905

Fig. 4

Acetes erythraeus Nobili, 1905: 394, fig. 1; 1906: 23, pl. 1, fig. 5. Kemp, 1917: 51, figs 1c-e, 2b, 3b, 4b, 5a, d, 7b. Barnard, 1950: 822; 1955: 42.

Description: Rostrum slightly elevated, apically acute, with two dorsal denticles. Strong supraorbital and hepatic spines present. Antennular peduncle with basal segment equal to third segment, latter twice length of second. Scaphocerite reaching to slightly beyond midpoint of third peduncle segment. Eye reaching almost to end of basal peduncle segment, much wider than eyestalk. Pereiopods slender, coxa pereopod three in female with distal and proximal process on inner face. Curved median forwardly directed spine between bases of first pleopods. Telson apically acute, reaching beyond middle of inner uropod ramus. Outer ramus with spine on outer margin. Petasma male with triangular apically acute processus ventralis. Capitulum proximally broad, distally more slender. Latter portion bears several small hooks, plus two large curved hooks at its base.

Distribution: Coast of Thailand, Coast of India, Red Sea.

Southern African localities: Delagoa Bay, Durban.

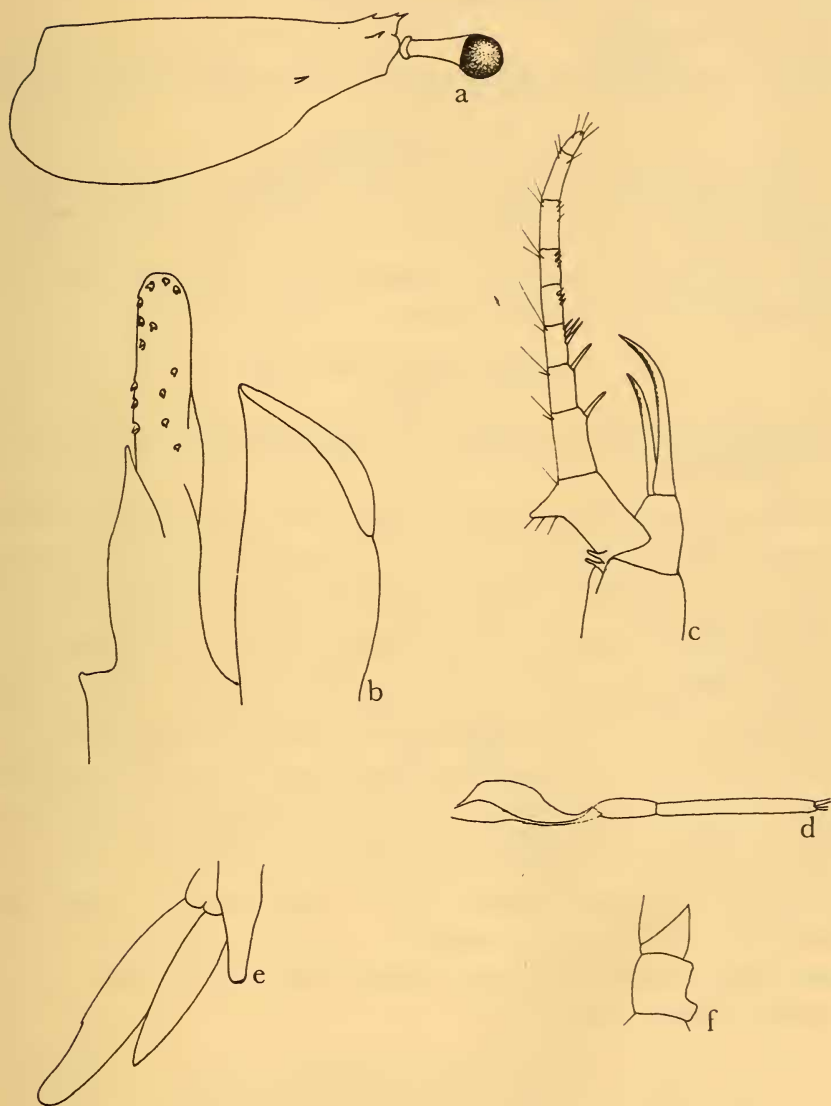
Material: 9 ♀♀, carapace length 6.2-9.0 mm; 5 ♂♂, carapace length 5.8-7.4 mm.

Acetes natalensis Barnard, 1955

Fig. 5

Acetes natalensis Barnard, 1955: 43.

Description: Rostrum slightly elevated, apically acute, with two dorsal denticles. Strong supraorbital and hepatic spines present. Antennular peduncle in male with basal segment shorter than third, latter almost three times length of middle segment. Scaphocerite reaching to end of middle segment. In female, scaphocerite reaches to middle of third segment, latter shorter than basal segment. Eye not quite reaching end of basal segment, wider than eyestalk. Pereiopods slender, coxa pereopod three in female with blunt proximal process on median

FIG. 5. *Acetes natalensis*

a. Carapace in lateral view; b. Petasma; c. Male outer antennular flagellum;
d. Antennular peduncle in lateral view; e. Telson and uropod in dorsal view;
f. Female coxa pereopod three.

face, no distal process. No spine present between bases of first pleopods. Telson apically truncate not reaching middle of inner uropod ramus. Petasma male with elongate cylindrical capitulum bearing several small hooks, and at its base on the inner side, a short triangular process.

Locality: Durban Bay.

Material: 5 ♀♀, carapace length 3.9–5.3 mm; 3 ♂♂, carapace length 5.6–5.9 mm.

Genus PETALIDIUM

Shrimp-like forms with first three pairs of pereopods elongate, second and third bearing a tiny chela. Pereopods four and five reduced, fourth longer than fifth. Pleurobranchs and pleurobranchial lamellae present above third maxilliped and first three pereopods, gill absent or rudimentary above fourth pereopod. Processus ventralis of petasma in male bifurcate.

Petalidium foliaceum Bate, 1881

Fig. 6

Petalidium foliaceum Bate, 1881: 194; 188: 349, pl. 60. Hansen, 1896: 936; 1903: 54, pl. 11, fig. 1. Illig, 1914: 372, figs 31–34. Stebbing, 1914b: 284, pl. 28. Burkenroad, 1937: 326. Hale, 1941: 261, figs 1, 2.

Description: Rostrum short, slightly elevated, somewhat variable, with single forwardly directed tooth, sometimes with posterior tooth. Cervical groove prominent, antennal and suprabranchial ridges strong. Minute hepatic spine present. Eyestalk with two median tubercles. Third maxilliped and all pereopods missing in all specimens. Telson apically acute, with two subapical spines and four plumed setae. Outer uropod ramus with minute tooth near apex. Petasma in male slender, elongate. Processus uncifer with strong subapical spine, apex acute. Processus ventralis slender, distally divided into long ramus armed with hooks, and short apically hooked ramus. Lobus terminalis bilobed, with long slender ramus, apically armed with hooks, and short slender ramus. Lobus inermis just below lower lobus terminalis lobe, short, blunt. Lobus armatus consisting of two blunt lobes armed with a few hooks.

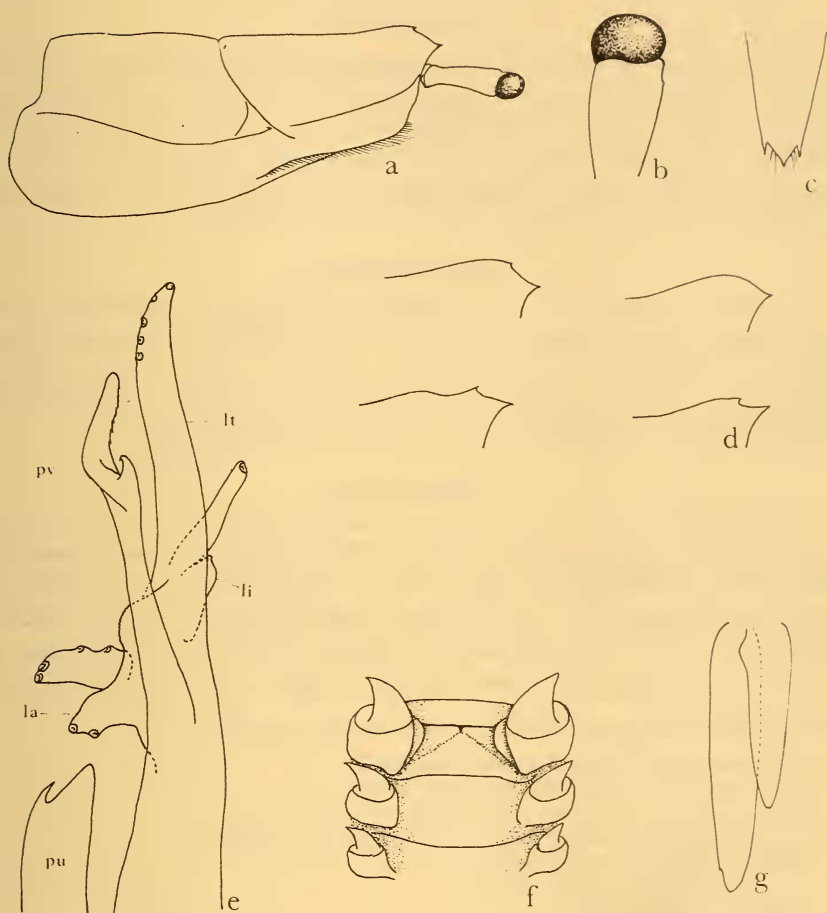
Distribution: Most of the southern seas, i.e. South Atlantic, southern Indian Ocean, south of Australia, Antarctic.

South African stations: A1879, A2945, A2958, A2963, A3616, A3643.

Material: Carapace length (mm)

♂	♀
8.0	6.0
9.3	6.5
9.7	8.1
9.9	9.5
10.6	11.8
11.0	12.8

Remarks: Although this species has been recorded from the south Atlantic, this


 FIG. 6. *Petalidium foliaceum*

a. Carapace in lateral view; b. Eyestalk; c. Telsonic apex; d. Rostral variation;
 e. Petasma; f. Thelycum; g. Uropod rami.

is the first record from the South African region. Unfortunately, because of the very soft nature of the exoskeleton, several of the specimens are damaged, while none have retained the third maxillipeds or the pereopods.

Genus SERGESTES

Shrimp-like forms with first three pairs of pereopods elongate, the second and third bearing a tiny chela. Pereopods four and five lacking dactyls, reduced, often flattened, bearing natatory setae, fifth usually shorter than fourth. First maxilla bearing palp, second maxilla bearing two lobes. First maxilliped bearing segmented palp. Branchial lamellae as well as arthrobranchs present. Processus ventralis of petasma in male not forked.

Subgenus SERGESTES

'Species of *Sergestes* s.l. with specialized luminescent modifications of the gastrohepatic gland (organs of Pesta) but without dermal photophores. Supra-orbital and hepatic spines maybe present or absent in adult. Ovary confined to cephalothorax. Colour in life due to red subcuticular chromatophores mainly concentrated on the anterior part of the body' (Yaldwyn, 1957).

Subgenus SERGIA

'Species of *Sergestes* s.l. without specialized luminescent modifications of the gastrohepatic gland (organs of Pesta). With or without dermal photophores which when present may or may not have cuticular lenses. Supraorbital and hepatic spines absent in adult (secondary hepatic prominences may sometimes be present). Ovary may extend into abdomen. Adult with red cuticular pigment distributed over entire body and appendages in life' (Yaldwyn, 1957).

Key to known southern African species of the subgenus *Sergestes*

- | | |
|---|-------------------|
| 1. Third maxillipeds subequal to third pereopods | 2 |
| — Third maxillipeds longer than third pereopods | 5 |
| 2. Two distal segments of pereiopod five setose on both margins | 3 |
| — Two distal segments of pereiopod five setose on only one margin | 4 |
| 3. Supraorbital spine present. | |
| Lobus armatus of petasma straight | <i>disjunctus</i> |
| — Supraorbital spine absent. | |
| Lobus armatus of petasma strongly curved | <i>corniculum</i> |
| 4. Third segment of antennular peduncle equal to or longer than first. | |
| Petasma lobes short, stumpy | <i>atlanticus</i> |
| — Third segment of antennular peduncle shorter than first. | |
| Petasma lobes elongate | <i>arcticus</i> |
| 5. Two distal segments of pereiopod five setose on both margins | 6 |
| — Two distal segments of pereiopod five setose on only one margin | 7 |
| 6. Dactylus and distal half of propodus of third maxilliped with numerous spines forming comb-like structure. | |
| Processus ventralis of petasma unarmed | <i>pectinatus</i> |
| — Dactylus and distal half of propodus of third maxilliped armed with spines but not forming comb-like structure. | |
| Processus ventralis of petasma armed distally with numerous spines | <i>sargassi</i> |
| 7. Dactylus of third maxilliped consisting of four segments | <i>armatus</i> |
| — Dactylus of third maxilliped consisting of six segments | <i>orientalis</i> |

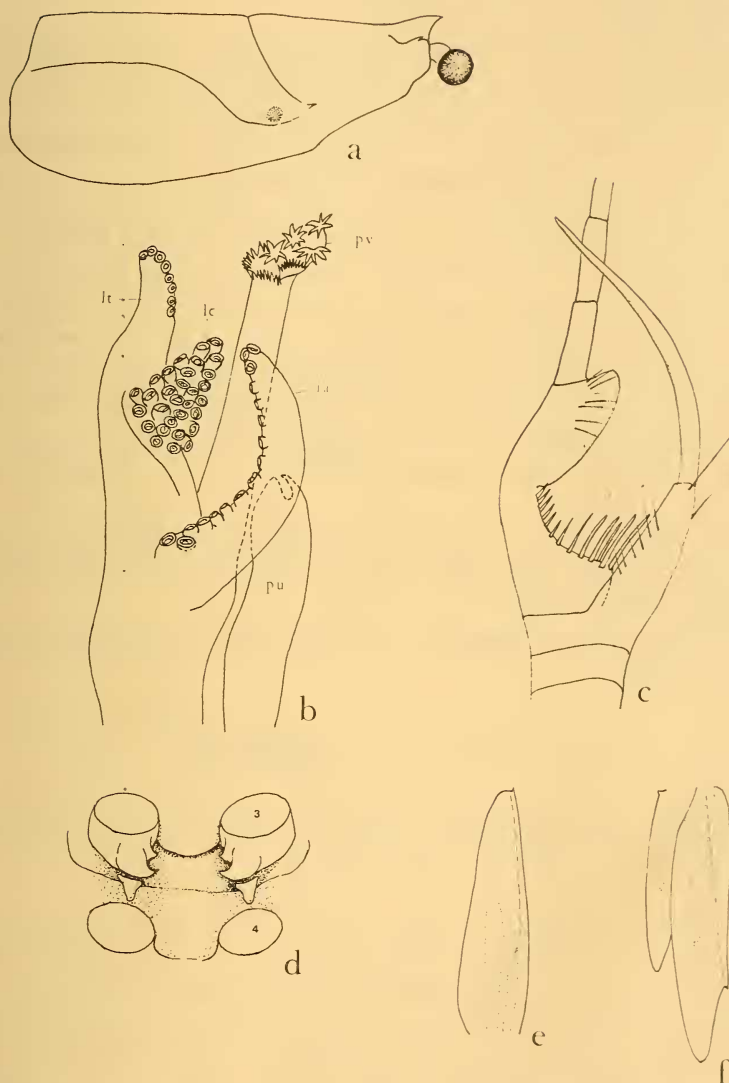


FIG. 7. *Sergestes (Sergestes) arcticus*

a. Carapace in lateral view; b. Petasma; c. Male, outer antennular flagellum;
d. Female, coxae pereipods three; e. Scaphocerite; f. Uropod.

Sergestes (Sergestes) arcticus Kröyer, 1859

Fig. 7

Sergestes arcticus Kröyer, 1859: 240. Smith, 1886, pl. 20, figs 1, 2. Ortmann, 1893: 33. Kemp, 1910: 30, pl. 3, figs 13-19. Sund, 1920: 8, fig. 5. Hansen, 1922: 62, pl. 1, figs 1, 2, pl. 3, fig. 3; 1925: 23. Illig, 1914: 355; 1927: 306, figs 53-65. Barnard, 1950: 639, fig. 120, a-d. Holthuis, 1952: 8, fig. 1. Grindley & Penrith, 1965: 280.

Sergestes (Sergestes) arcticus Yaldwyn, 1957: 9, figs 1-5.

Description: Rostrum short, horizontal, apically acute. Strong supraorbital spine and ridge present. Cervical groove distinct, with hepatic spine at its base, suprabranchial ridge distinct. Eyes laterally directed, no ocular tubercle. Scaphocerite with apical spine on outer margin. Two distal antennular peduncle segments equal in length to basal segment. Maxilliped three slender, not longer than pereopods. Coxa pereopod three in female with broad incurved hook, sternum bearing rounded flap-like operculum. Fifth pereopod slightly more than half length of fourth, two distal segments setose on only one margin. Telson apically acutely rounded, outer uropod ramus with spine at about distal third. Petasma in male with elongate curved lobus armatus, armed with row of hooks on inner margin, lobus connectens triangular, covered with large hooks, lobus terminalis with few distal hooks, processus ventralis distally expanded, armed with several clustered spine-like hooks.

Distribution: North and South Atlantic, off Chile, off New Zealand, South Australia.

South African stations: IK40, IK50, IK51, PF2380, PF16832, A1877, A1879, A1889, A2391, A2393, A2394, A2950, A2953, A2958, A2961, A2962, A2963, A2966, A3643, A3634, A2968.

Material: Average carapace length for 24 ♂♂: 9.5 mm. Average carapace length for 40 ♀♀: 12.7 mm.

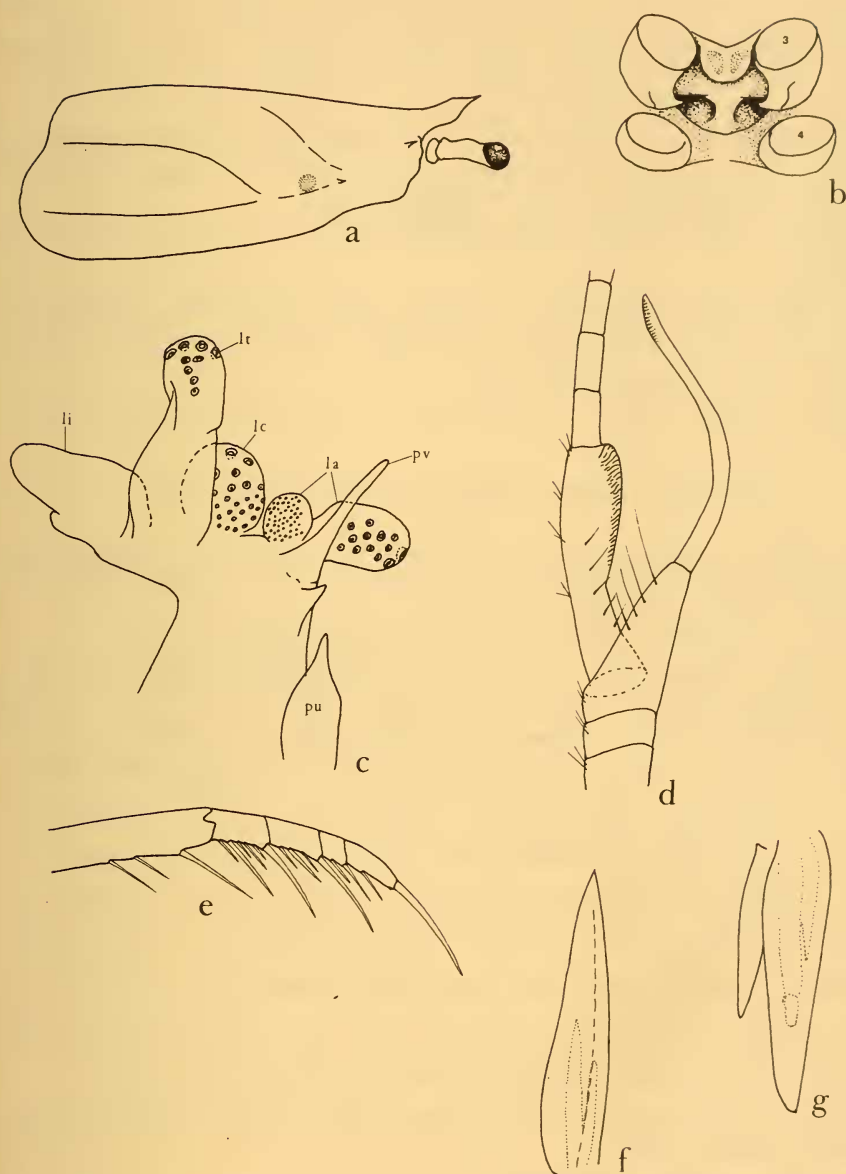
Sergestes (Sergestes) armatus Kröyer, 1855

Fig. 8

Sergestes armatus Kröyer, 1855: 10. Ortmann, 1893: 36. Hansen, 1896: 966; 1903: 63; 1922: 174, pl. 10, figs 6a-k; 1925: 26. Sund, 1920: 23, figs 39-41. Burkenroad, 1937: 321. Barnard, 1950: 643, figs 120, m-p. Grindley & Penrith, 1965: 281.

Sergestes (Sergestes) armatus: Yaldwyn, 1957: 8. Kensley, 1968: 304.

Description: Rostrum somewhat elongate, apically acute with trace of dorsal denticle. Small supraorbital and hepatic spines present. Suprabranchial ridge present, cervical groove weakly defined. Eyestalk bearing ocular tubercle medio-distally, reaching to middle of basal antennular peduncle segment. Latter two-thirds length of third peduncle segment. Median segment shorter than basal. Scaphocerite apically pointed without spine on outer margin, reaching at least to midpoint of third antennular peduncle segment. Maxilliped three longer and stouter than pereopods, dactylus consisting of four segments bearing about 15 long and short spines. Two proximal segments equal in length, longer than two distal segments, penultimate segment shortest. Fifth pereopods

FIG. 8. *Sergestes (Sergestes) armatus*

- a. Carapace in lateral view; b. Female coxa pereopod three; c. Petasma;
 d. Male, outer antennular flagellum, e. Maxilliped three dactylus;
 f. Scaphocerite; g. Uropod.

short slender, two distal segments setose on only one margin. Coxa pereopod three in female with short acute median facing process, sternum with rounded flap-like operculum. Outer ramus of uropod setose for slightly more than two-thirds length of outer margin. Telson apically narrowly rounded. Petasma in male with elongate lobus terminalis armed with distal hooks, lobus inermis unarmed, stout, lobus connectens globular with numerous hooks, lobus armatus consisting of small rounded lobe armed with numerous tiny hooks and elongate rounded lobe with large hooks. Processus ventralis slender, elongate, with small process at its base. Processus uncifer apically pointed.

Distribution: North Atlantic, Mediterranean, off Azores and Canaries, South Atlantic.

South African stations: A318, A319, IK6, IK7, IK34, IK35, IK36, IK37, IK38, IK39, IK41, IK42, IK44, IK45, IK46, IK51, A1896, A2958, A2962, A2963, A2966, A2968, A3634, A3643, A4229.

Material: Average carapace length for 20 ♂♂: 10.9 mm. Average carapace length for 28 ♀♀: 11.9 mm.

Sergestes (Sergestes) atlanticus H. Milne Edwards, 1830

Fig. 9

Sergestes atlanticus. H. Milne Edwards, 1830: 346. Bate, 1888: 389, pls 48, 49. Ortmann, 1893: 33. Hansen, 1896: 951; 1903: 58; 1919: 8, 1922: 41, pl. 2, fig. 1. Illig, 1914: 350, fig. 2; 1927: 286, figs 11-14. Sund, 1920: 7, fig. 4.

Sergestes (Sergestes) atlanticus Yaldwyn, 1957: 8. Kensley, 1968: 303, figs 9d, 10c, 11d.

Description: Rostrum hardly elevated, short, apically acute, slight supraorbital ridge, strong supraorbital spine. Cervical groove distinct, dorsally feeble, strong hepatic spine at its base. Suprabranchial ridge distinct. Eye reaching to mid-point of basal antennular peduncle segment. Latter elongate, basal segment equal in length to third segment, middle segment shorter. Scaphocerite reaching to about midpoint of third antennular peduncle segment, with small terminal spine on outer margin. Maxilliped three slender, equal in length to pereopod three, dactylus of eight segments, decreasing in length distally. Fifth pereopod about half length of fourth, two distal segments setose on only one margin. Outer margin of outer uropod ramus with spine at distal third. Telson apically acutely rounded. Petasma in male, with broadly triangular processus ventralis, lobus armatus low, rounded, armed with several hooks, lobus connectens small slender, lobus terminalis a bulge armed with hooks on lobus inermis, latter a rounded unarmed lobe. Processus uncifer with minute terminal hook.

Distribution: Mediterranean, North Atlantic, off Azores and Canaries, Sargassum Sea, off Cape Point.

South African stations: IK6, A2966.

Material: Carapace length (mm)

♂

5.3

6.8

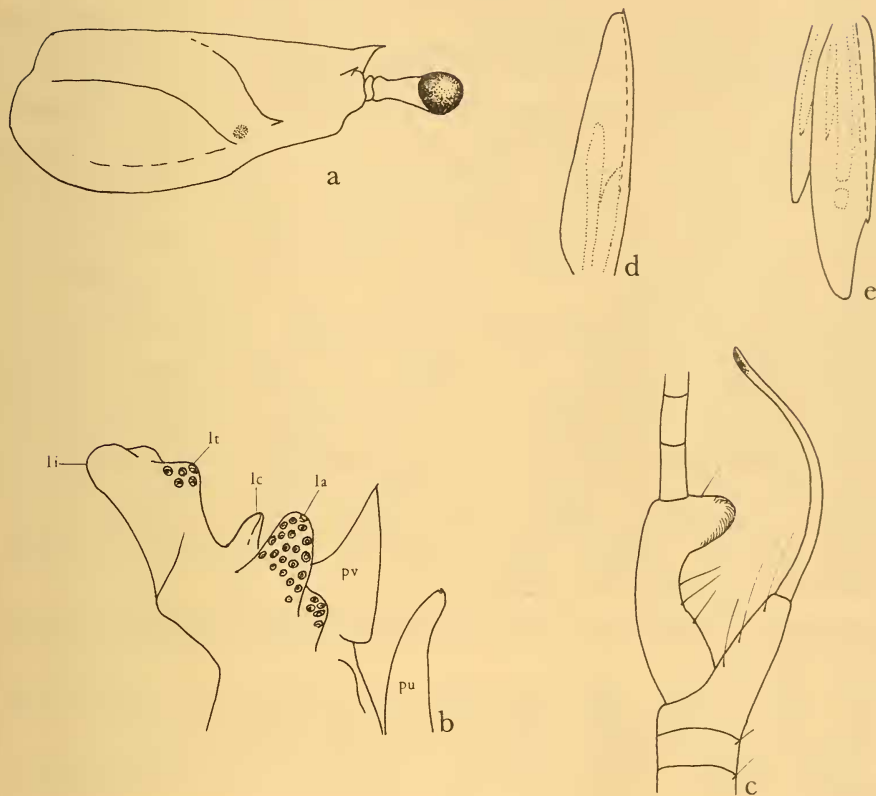


FIG. 9. *Sergestes* (*Sergestes*) *atlanticus*

a. Carapace in lateral view; b. Petasma; c. Outer flagellum antennular;
d. Scaphocerite; e. Uropod.

Sergestes (Sergestes) corniculum Kröyer, 1955

Fig. 10

Sergestes corniculum Kröyer, 1855: 22. Ortmann, 1893: 34. Hansen, 1896: 957; 1922: 126, pl. 1, figs 6, 7, pl. 7, fig. 3a-q, pl. 8, fig. 1a-i. Sund, 1920: 9, figs 6-10. Illig, 1914: 357, figs 6-10; 1927: 311, figs 68-76. Burkenroad, 1937: 316.

Sergestes (Sergestes) corniculum: Yaldwyn, 1957: 7. Kensley, 1968: 307, figs 9a, 10b, 11b.

Description: Rostrum broadly rounded with single apical point. Supraorbital ridge present. Well defined cervical groove, reaching dorsum at carapace mid-point. Well-defined suprabranchial and branchial ridges. Minute hepatic spine present, from which a strong ridge runs anteriorly to level of antennae. Eyestalk with ocular tubercle on medio-distal face. Eye reaching midpoint of basal antennular peduncle segment. Scaphocerite lacking apical spine, reaching almost to midpoint of third antennular peduncle segment. Maxilliped three slender, not longer than pereopod three. Latter slender, elongate, reaching well beyond antennular peduncle, propodus and carpus bearing along their edges numerous elongate spines separated by several smaller spines. Coxa pereopod three in female bearing blunt median process, sternum with straight-edged flap-like operculum. Telson apically acute, outer margin of exopod uropod setose for about half its length. Petasma in male with processus ventralis distally expanded, bearing about 11 or 12 acute papillae. Lobus armatus stout, curved, apically and proximally armed with hooks. Lobus connectens slender armed with two apical hooks. Lobus terminalis armed with cluster of hooks distally. Lobus inermis slender elongate, apically pointed, unarmed. In preserved specimens, scattered pigment spots may be observed on the dorsal surface of the carapace and abdomen.

Distribution: Mediterranean, North Atlantic, off the Azores and Canary Islands, Sargassum Sea.

South African stations: A321, IK6, IK34, IK35, IK39, IK41, IK42, IK44, IK48, IK50, A2958, A2962, A2963, A2968, A3616, A3634, A4218.

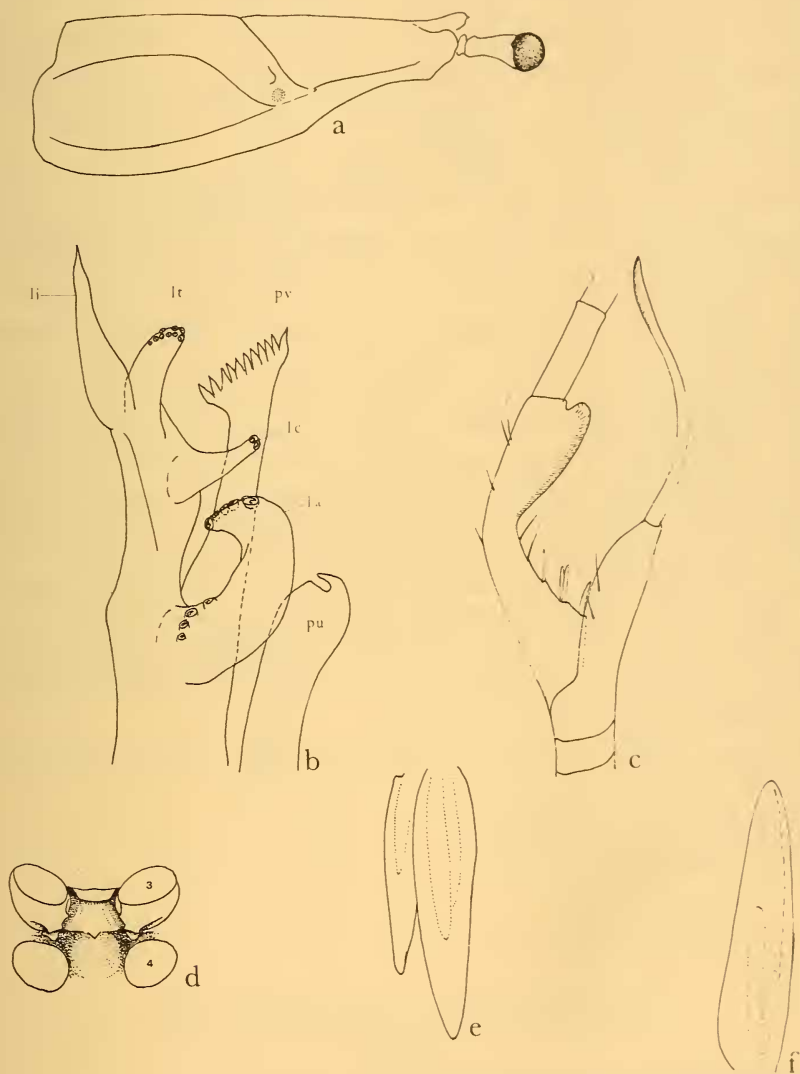
Material: Average carapace length for 21 ♂♂: 20.1 mm. Average carapace length for 22 ♀♀: 21.0 mm.

Sergestes (Sergestes) disjunctus Burkenroad, 1940

Fig. 11

Sergestes (Sergestes) disjunctus Burkenroad, 1940: 38. Yaldwyn, 1957: 8.

Description: Rostrum slightly elevated, with short acute anteriorly facing apex. Strong supraorbital spine present. Well-developed cervical groove, stretching forward from about the dorsal midpoint of the carapace, with strong hepatic spine at its base. Strong suprabranchial and lateral branchial ridges, also a ridge stretching anteriorly from hepatic spine almost to anterior margin of carapace, in antennal region. Eyes laterally directed, eyestalk with very low ocular tubercle. Basal segment of antennular peduncle equal in length to third segment, middle segment slightly shorter. Scaphocerite damaged. Third


 FIG. 10. *Sergestes (Sergestes) corniculum*

a. Carapace in lateral view; b. Petasma; c. Outer antennular flagellum;
 d. Female coxae pereopod three; e. Uropod; f. Scaphocerite.

maxillipeds missing but coxae not larger than those of pereopods one to three. Pereiopods four and five flattened, bearing long setae, fifth about half length of fourth, two distal segments setose on both margins. Outer ramus of uropod with outer margin lacking spine, setose for slightly more than half its length. Telson damaged. Petasma in male with elongate straight lobus armatus, bearing small cluster of terminal hooks separated by an unarmed area from larger cluster of proximal hooks. Lobus connectens stouter than lobus terminalis, covered with numerous small hooks. Lobus terminalis slender, with several terminal hooks, lobus inermis as slender as lobus terminalis, unarmed. Processus ventralis apically flared, bearing seven or eight small irregularly spined papillae.

Remarks: Although most of the third maxillipeds of these specimens are missing, the size of the remaining coxae indicate that these appendages were not of the elongate and stout type as found in the 'sargassi' group. This fact, together with the setose nature of both margins of the fifth pereiopods, places the specimens in the 'corniculum' group (Yaldwyn, 1957: 7). Superficially the specimens are almost identical to *S. corniculum* Kröyer, but the structure of the petasma immediately separates them. The lobus armatus is curved in *S. corniculum*, the lobus connectens slender, the processus ventralis bearing a continuous row of terminal spines. The present specimens differ in all these characters. The lower flagellum of the antennule also lacks some of the spines found in *S. corniculum*. The presence of a supraorbital spine also separates the specimens from *S. corniculum*, *S. coalitus* Burkenroad, *S. erectus* Burkenroad, and *S. seminudus* Hansen. The specimens also differ from the latter species in the structure of the petasma, where the lobus connectens is relatively more slender and the lobus terminalis more stout.

The present South African records are separated by several thousand miles from the original *Dana* record of *S. disjunctus*; nevertheless, the specimens are placed in this species as they agree well with both Burkenroad's description, and with the type material.

Distribution: 34°24'S, 178°42'E. (Off North Island, New Zealand, *Dana* station 3630 IV).

South African stations: A317, A4128.

Material: Carapace length (mm)

♂
15.9
18.0

Sergestes (Sergestes) orientalis Hansen, 1919

Fig. 12

Sergestes orientalis Hansen, 1919: 22, pl. 2, fig. 2.

Sergestes (Sergestes) orientalis: Yaldwyn, 1957: 8. Milne, 1968: 30.

Description: Rostrum short, slightly elevated, apically acute. Small supra-orbital spine present. Cervical groove barely visible, with strong hepatic spine at its base. Eyes reaching slightly beyond midpoint of basal antennular peduncle

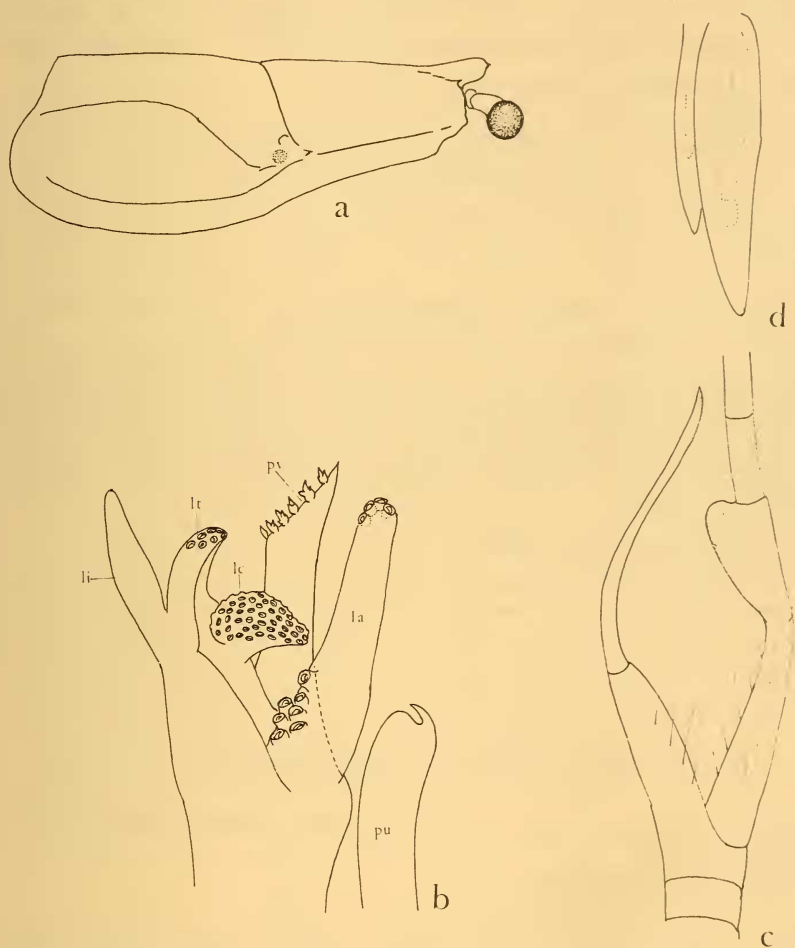


FIG. 11. *Sergestes (Sergestes) disjunctus*
 a. Carapace in lateral view; b. Petasma; c. Outer antennular flagellum; d. Uropod.

segment, scarcely wider than eyestalk. Antennular peduncle with basal segment equal in length to third segment, middle segment shorter. Maxilliped three much longer than pereopods, four proximal segments stout, two distal segments slender, flattened. Dactylus consisting of six segments, first slightly shorter than second, four distal segments small, equal in length, three together equal to second segment in length. Terminal segment bearing a long and short spine terminally. Fifth pereopods with two distal segments setose on only one margin. Coxa pereopod three in female with short pointed basal protuberance.

Distribution: South-east of South Africa, China Sea.

Remarks: The enlarged third maxillipeds, having a six-segmented dactylus, and a fifth pereopod with the two distal segments setose on only one margin, places these females in the 'edwardsi' group of species (Yaldwyn, 1957). *S. (S.) edwardsi* has a more slender lanceolate rostrum, and two subequal terminal dactyl spines on the third maxilliped, unlike the present specimens, which have a broader rostrum, and very unequal terminal spines. *S. (S.) tantillus* and *S. (S.) semissis*, both described by Burkenroad in 1940, are said to have the third maxillipeds as in *S. edwardsi*. *S. consobrinus* Milne is very similar to the present specimens, but the spine count of the dactyl of the third maxilliped (36) does not agree with the former species (47-50). Thus, in spite of the lack of a male specimen to confirm the specific identity, these females are placed in *S. (S.) orientalis*. Comparison with Hansen's *Siboga* cotype material has further strengthened this identification.

South African stations: A2945, A2966.

Material: Carapace length (mm)

♀
6.9
7.3
8.0

Sergestes (Sergestes) pectinatus, Sund, 1920

Fig. 13

Sergestes pectinatus Sund, 1920: 24, figs 42-43. Hansen, 1922: 142, pl. 8, fig. 4. Illig, 1927: 315, figs 77-80.

Sergestes (Sergestes) pectinatus: Yaldwyn, 1957: 8.

Sergestes henseni (non Ortmann) Illig, 1914: 360, figs 11-16.

Description: Rostrum short, hardly elevated, apically acute, anterior margin vertical. No supraorbital ridge, strong supraorbital spine. Cervical groove well-developed with small hepatic spine at its base. Strong suprabranchial ridge present. Eyestalk, with tiny ocular tubercle on inner distal margin, reaching beyond midpoint of basal segment of antennular peduncle. Latter with two distal segments equal in length, basal segment slightly longer. Scaphocerite with tiny spine on outer distal angle. Maxilliped three longer than pereopods, four basal segments stout, two distal segments slender. Dactylus consisting of five segments basal segment about twice length of following seg-

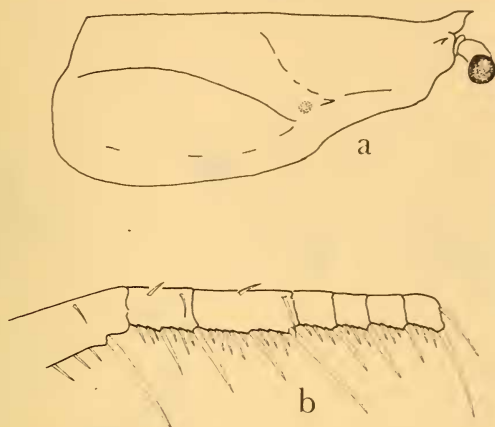


FIG. 12. *Sergestes (Sergestes) orientalis*
a. Carapace in lateral view; b. Maxilliped three dactylus.

ment, distal four segments of about equal length. Dactylus and distal half of propodus with a fringe of short spines forming a comb-like structure, interspersed with single longer spines. Pereiopods four and five flattened, fifth about half length of fourth, two distal segments setose on both margins. Coxa pereiopod three in female with short hooked basal protuberance, sternum with triangularly rounded flap-like operculum. Outer uropod ramus lacking spine on outer margin, latter setose for about four-fifths of its length. Telson apically acutely rounded. Petasma in male lacking lobus inermis and lobus connectens. Lobus armatus basally stout distally slender, slightly curved, with single apical hook, two large proximal hooks. Lobus terminalis elongate curved, with single apical hook, two large proximal hooks. Processus ventralis slender, elongate, unarmed.

Distribution: Sargassum sea, North Atlantic, off Canaries, Azores.

South African stations: A2386, A3641.

Material: Carapace length (mm)

♂	♀
4.1	5.0
6.5	8.3
	8.3

Sergestes (Sergestes) sargassi Ortmann, 1893

Fig. 14

Sergestes sargassi Ortmann, 1893: 34, pl. 3, fig. 1. Hansen, 1896: 959; 1922: 148, pl. 9, fig. 2.

Sergestes (Sergestes) sargassi: Yaldwyn, 1957: 8. Kensley, 1968: 304, figs 9c, 10d, 11c.

Sergestes henseni (non Ortmann) Sund, 1920: 25, figs 44-47.

Description: Rostrum hardly elevated, apically acute, anterior margin vertical. No supraorbital ridge, minute supraorbital spine present. Well-defined cervical

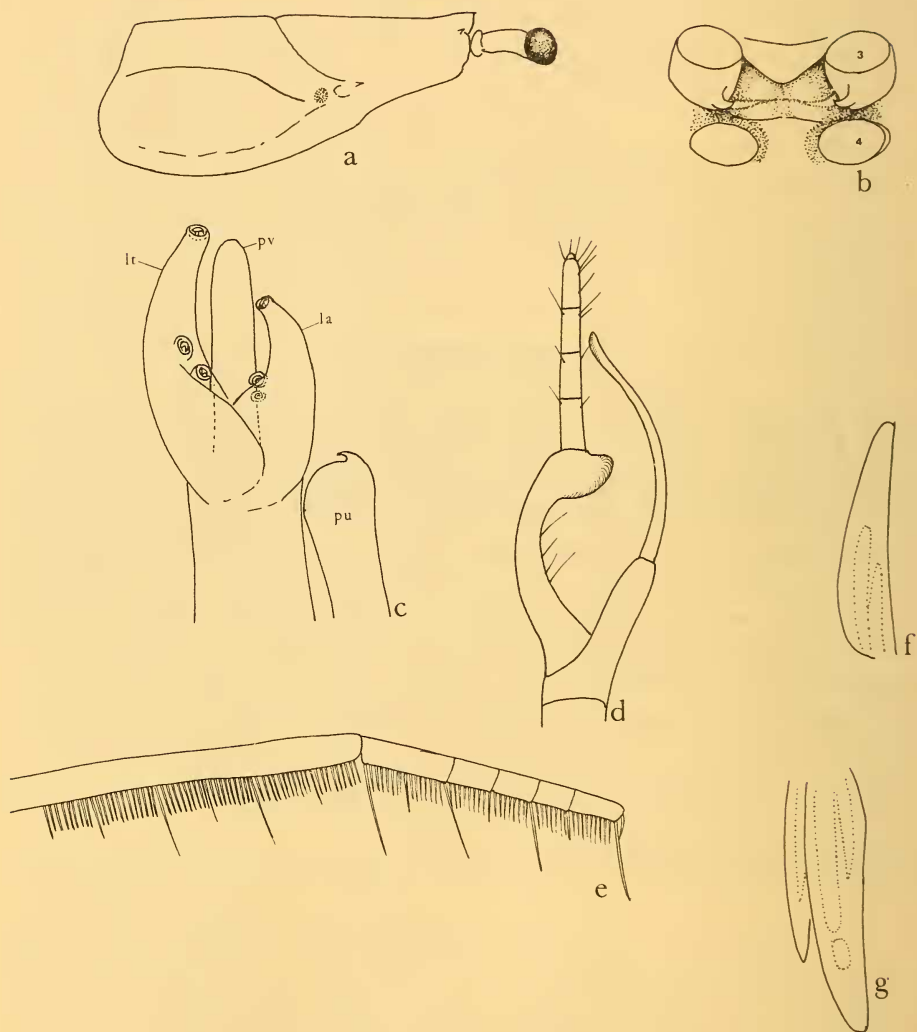
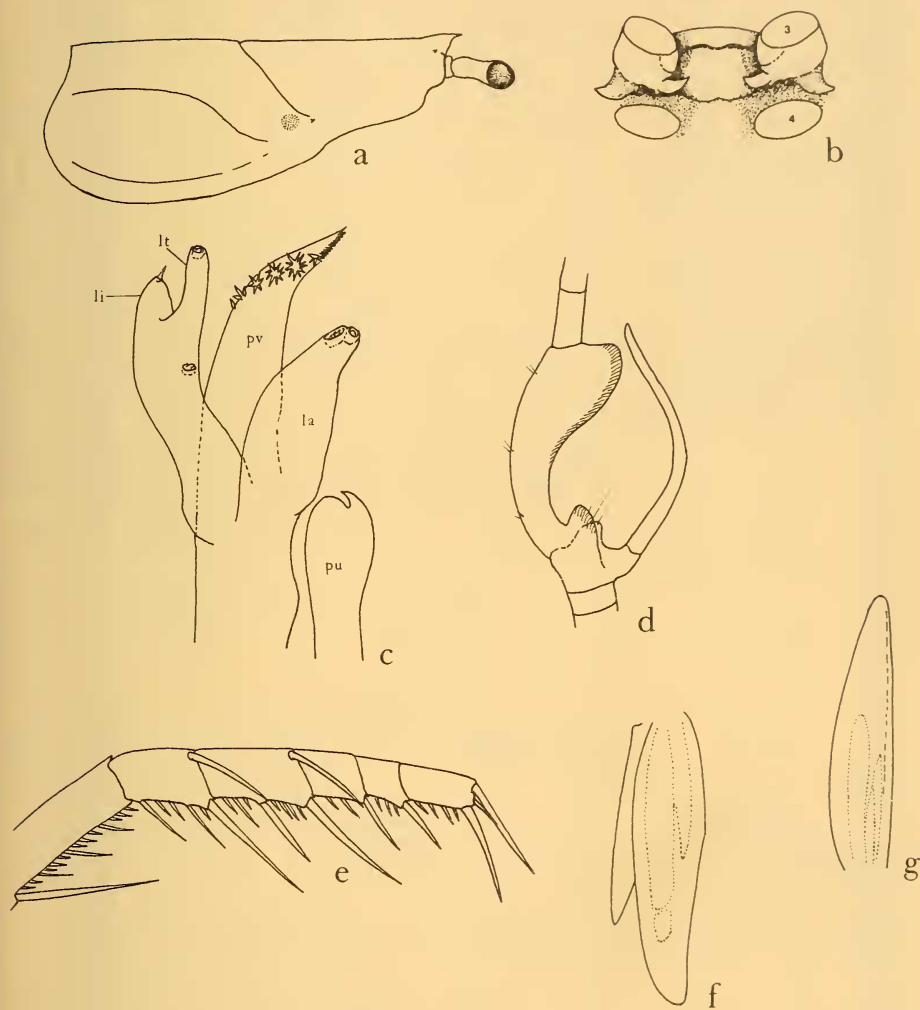
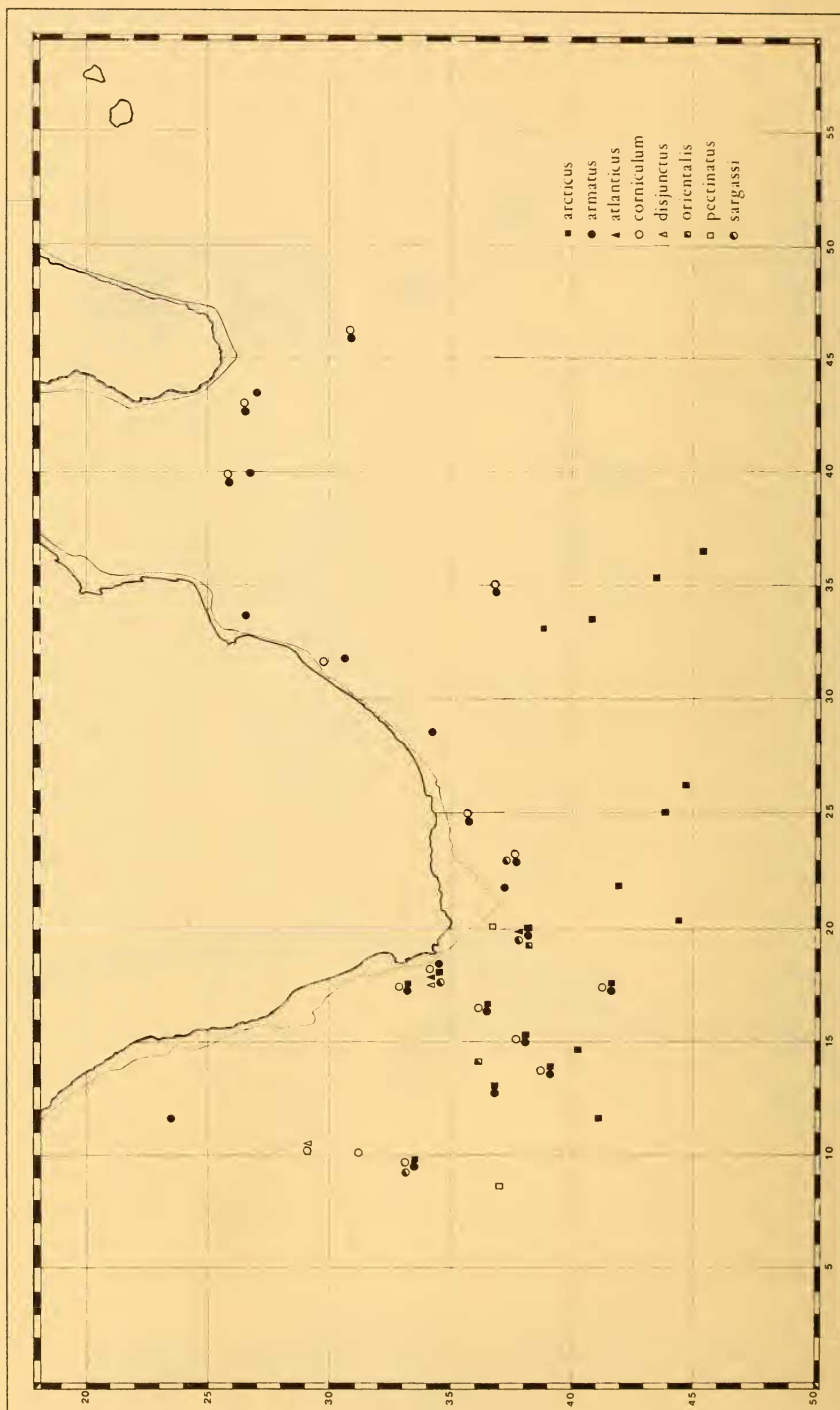


FIG. 13. *Sergestes (Sergestes) pectinatus*

- a. Carapace in lateral view; b. Female coxae pereopod three; c. Petasma;
 d. Outer flagellum antennular; e. Propodus distal end and dactylus of maxilliped three;
 f. Scaphocerite; g. Uropod.


 FIG. 14. *Sergestes (Sergestes) sargassi*

a. Carapace in lateral view; b. Female coxae pereopod three; c. Petasma;
 d. Outer antennular flagellum; e. Dactylus of maxilliped three; f. Uropod;
 g. Scaphocerite.

FIG. 15. Map showing distribution of the subgenus *Sergestes* around southern Africa.

groove stretching forward from dorsal midpoint of carapace with a minute hepatic at base. Strong suprabranchial ridge. Eyes reaching to midpoint of basal segment of antennular peduncle. Latter slender, two distal segments equal in length, basal segment slightly longer. Scaphocerite lacking spine on outer distal margin. Maxilliped three longer than pereopods, four basal segments stout, two distal segments slender. Dactylus consisting of five segments, basal segment equal in length to distal segment, second segment longest, third and fourth segments together equal to terminal segment. Latter with two long and one short terminal spines. All segments bearing a few long spines and numerous short spines. Propodus with similar spination distally. Pereiopods slender, third reaching slightly beyond antennular peduncle. Fifth pereopod less than half length of fourth, two distal segments setose on both margins. No spine on outer margin of outer uropod ramus. Telson narrow, apically acutely rounded. Coxa pereopod three in female bearing on postero-medial angle, a tridentate process, the two outer teeth being small, the median tooth strong, incurved. The postero-lateral angle of the coxa bears a large outwardly curved horn-shaped protuberance. Petasma in male with lobus armatus elongate stout, with two strong terminal hooks, lobus terminalis slender, with single terminal hooks basally joined to lobus inermis bearing a terminal spine. Processus ventralis elongate with several distal stellate spines, plus row of single spines.

Distribution: Off Madeira, Azores, Sargassum Sea.

South African stations: IK6, IK39, A2966, A3634.

Material: Carapace length (mm)

♂	♀
7.0	8.0
7.8	
8.0	
8.2	

Key to known southern African species of the subgenus Sergia

1. Dermal photophores present 2
- Dermal photophores absent *laminatus*
2. Photophores bearing cuticular lenses 3
- Photophores lacking lenses, of opaque spot type 4
3. Lower branchiostegite bearing row or at least 18 photophores. Scaphocerite bearing about 12 photophores *prehensilis*
- Lower branchiostegite bearing row of 9–12 minute photophores. Scaphocerite bearing seven photophores *scintillans*
4. Rostrum elongate/lanceolate *creber*
- Rostrum not elongate/lanceolate 5
5. Rostrum strongly bidentate or bifid 6
- Rostrum with single apical tooth 7
6. Strong post-cervical groove present.
 - Coxa of pereopod three female with apically acute leaf-shaped process. Petasma of six lobes (excluding processus uncifer) *regalis*
 - No post-cervical groove present.
 - Coxa of pereopod three female with blunt process. Petasma male with eight lobes (excluding processus uncifer) *potens*

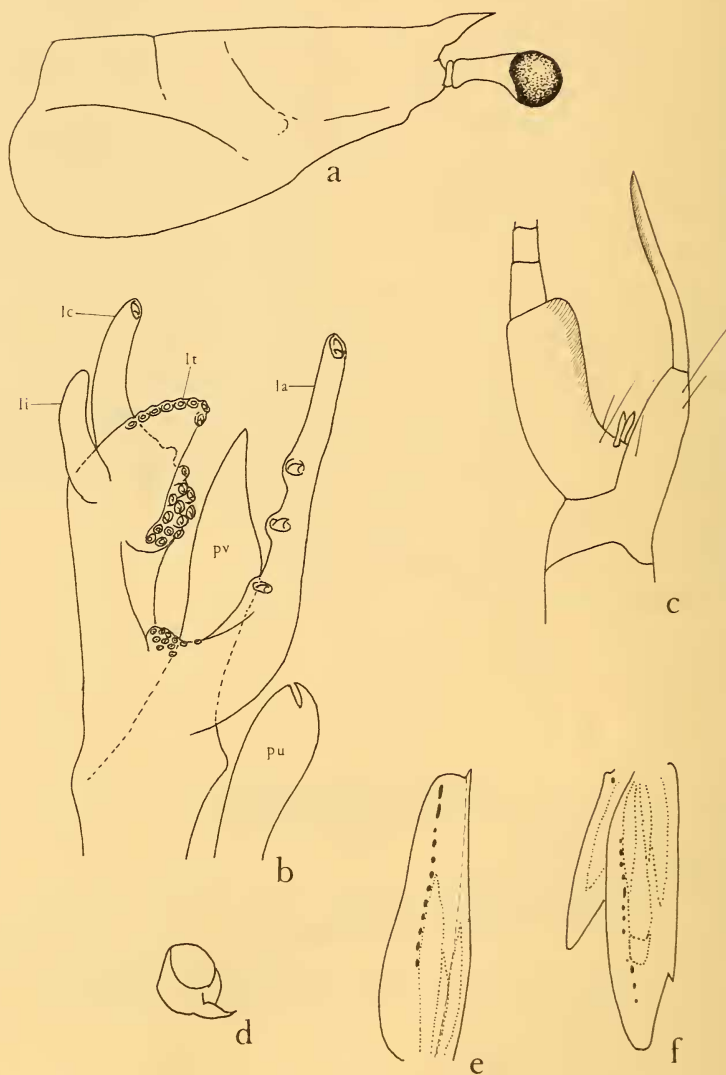


FIG. 16. *Sergestes (Sergia) creber*
 a. Carapace in lateral view; b. Petasma; c. Outer antennular flagellum;
 d. Female coxa pereiopod three; e. Scaphocerite; f. Uropod.

7. Rostrum broadly rounded.
 Outer uropod ramus with two groups of photophores *grandis*
 —. Rostrum not broadly rounded, with hint of dorsal denticle.
 Outer uropod ramus with single continuous row of small photophores . . . *splendens*

Sergestes (Sergia) creber Burkenroad, 1940

Fig. 16

Sergestes (Sergia) creber Burkenroad, 1940: 44. Yaldwyn, 1957: 9.

Description: Rostrum elongate, elevated, tapering to sharp point. No supra-orbital ridge or spine. Cervical groove laterally visible, dorsally obsolete. No hepatic spine, but a slight knob present. Post-cervical groove dorsally and laterally prominent. Eyestalk lacking ocular tubercle, reaching to middle of basal antennular peduncle segment. Latter longer than second or third segments. Maxilliped three slender, not longer than pereopods. Pereiopod three reaching well beyond antennular peduncle. Coxa pereiopod three in female bearing large leaf-shaped apically acute process. Scaphocerite almost reaching middle of third peduncular segment, bearing row of about 12 photophores of the opaque-spot type. Fifth pereiopod half length of fourth, both bearing long setae flattened. Sixth abdominal segment ending dorsally in sharp spine. Outer uropod ramus with spine at about distal third on outer margin, bearing about 12 photophores. Telson apically acute. Petasma male with slender curved unarmed lobus inermis. Lobus terminalis broadly triangular, with single row of about eight hooks on upper margin. Lobus connectens longer than lobus terminalis, with single terminal hook and numerous proximal hooks. Lobus armatus elongate slender, with large terminal hook and three large hooks in mid-region, small lobus accessorius at base bearing several tiny hooks. Processus ventralis leaf-shaped, shorter than lobus armatus, unarmed.

Distribution: 01°13'S, 138°42'E. (Off northern coast of New Guinea, *Dana* Station 3766 XVIII.)

South African stations: IK35, A3643.

Material: Carapace length (mm)

♂	♀
15.0	19.9
18.5	

Remarks: These specimens are very similar to *S. regalis* Gordon but differ in the following respects: the rostrum is elongate-lanceolate, whereas in *S. regalis* it is almost always bidentate. There are also differences in the spination of the lower antennular flagellae, and in the photophore pattern of the outer uropod ramus, there being more photophores in the present species. The petasma is also very similar to *S. regalis*, the only differences being in the more slender lobus inermis, and in the lower number of hooks on the lobus armatus in the present species. Burkenroad (1940) does not compare his species with *S. regalis* which was described in the previous year. The present specimens are placed in *S. creber*, in spite of the fact that the latter species has not been figured, and that

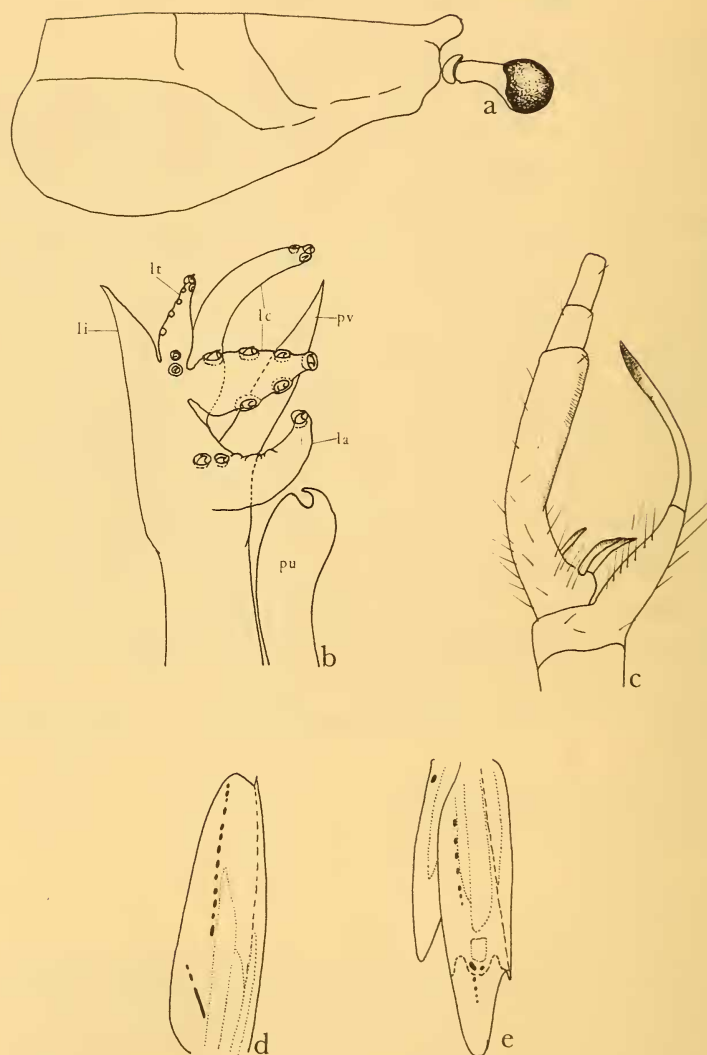


FIG. 17. *Sergestes (Sergia) grandis*
a. Carapace in lateral view; *b.* Petasma; *c.* Outer antennular flagellum;
d. Scaphocerite; *e.* Uropod.

the present records are separated by several thousand miles from the original *Dana* record. Comparison with the type material of *S. creber* strengthens this identification.

Sergestes (Sergia) grandis Sund

Fig. 17

Sergestes grandis Sund, 1920: 16, figs 22–26. Hansen, 1922: 92, pl. 5, figs 3a–p.

Sergestes (Sergia) grandis: Yaldwyn, 1957: 9.

Description: Rostrum low, rounded, with small apical tooth. No supraorbital spine or ridge. Cervical groove dorsally and laterally fairly prominent. Posterior cervical groove present, but not very obvious. Suprabranchial groove strong. No hepatic spine or knob. First and second antennular peduncle segments equal in length third segment shorter. Eyestalk with tiny ocular tubercle at disto-medial corner. Scaphocerite reaching to middle of third peduncular segment, bearing row of opaque-spot photophores. Third maxilliped not longer or more robust than rest of pereopods. Fourth and fifth pereopods flattened, bearing long setae. Two distal segments pereopod five setose on both margins. Outer margin of outer uropod ramus with spine at distal third. Petasma with lobus inermis unarmed, apically acute, lobus terminalis slender, with few scattered hooks. Lobus connectens bilobed, upper lobe slender, curved, with few apical hooks, lower lobe broader with several large hooks. Lobus armatus short, curved, armed with few scattered hooks. Processus ventralis slender, tapering, unarmed, reaching almost to tip of upper lobus connectens lobe. Coxa pereopod three in female with blunt short median lobe, similar to *Sergestes potens*.

Distribution: North Atlantic.

South African stations: IK35, WR2.

Material: Carapace length (mm)

♂	♀
15.0	18.3
17.6	
22.0	
26.4	

Remarks: The presence of opaque-spot type photophores places this species in the 'robustus' group. The petasma is in general similar to that of *S. grandis*, as figured by Sund (1920) and Hansen (1922), but differs in the relative proportions of the lobes, the upper lobus connectens lobe being much longer than as figured. The lower lobe also differs somewhat from the figures. The lobus armatus is slightly longer than in Hansen's figures. The structure of the scaphocerite and uropod, however, is identical with Sund's description, while comparison with material from the *Atlantide* Expedition, from the Universitetets Zoologiska Museum, Copenhagen, further strengthens this identification.

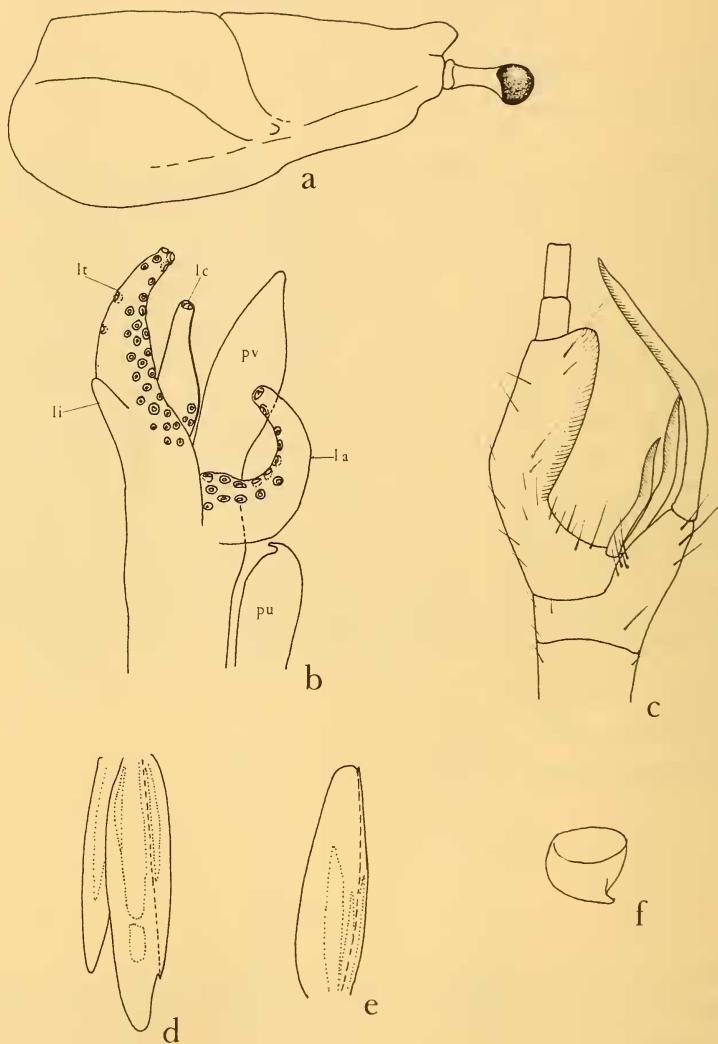


FIG. 18. *Sergestes (Sergia) laminatus*
a. Carapace in lateral view; *b.* Petasma; *c.* Outer antennular flagellum; *d.* Uropod;
e. Scaphocerite; *f.* Female coxa pereiopod three.

Sergestes (Sergia) laminatus Burkenroad, 1940

Fig. 18

Sergestes (Sergia) laminatus Burkenroad, 1940: 53. Yaldwyn, 1957: 9.

Description: Rostrum low, rounded, no apical spine, very slight supra-orbital ridge, no supraorbital spine. Integument membranous, cervical groove dorsally and laterally distinct. Suprabranchial ridge prominent. No hepatic spine but a slight knob present. Slight ridge running anteriorly from this knob. Eyestalk with small ocular tubercle on inner distal margin. Antennular peduncle short, eye reaching slightly beyond midpoint of basal segment. Two distal segments together equal to basal segment in length. Scaphocerite reaching to beyond midpoint of third segment, with small apical spine on outer distal margin. Maxilliped three slender, not longer than pereopods two or three. Coxa pereopod three in female with very short pointed process. Fifth pereopod short, flattened, two distal segments setose on both margins. Outer uropod ramus with spine on outer margin, setose portion of which about one third length of non-setose portion. Telson apically acute. No dermal photophores visible in preserved specimens. Petasma in male with strongly curved lobus armatus bearing several hooks along inner margin, lobus terminalis elongate curved, bearing small lobus inermis near its base, whole of inner face armed with hooks. Lobus connectens elongate, shorter than lobus terminalis, with single terminal hook and several proximal hooks. Processus ventralis a large broad unarmed leaf-shaped process, slightly shorter than lobus terminalis. Lower antennular flagellum male bearing two stout serrated spines on the third segment.

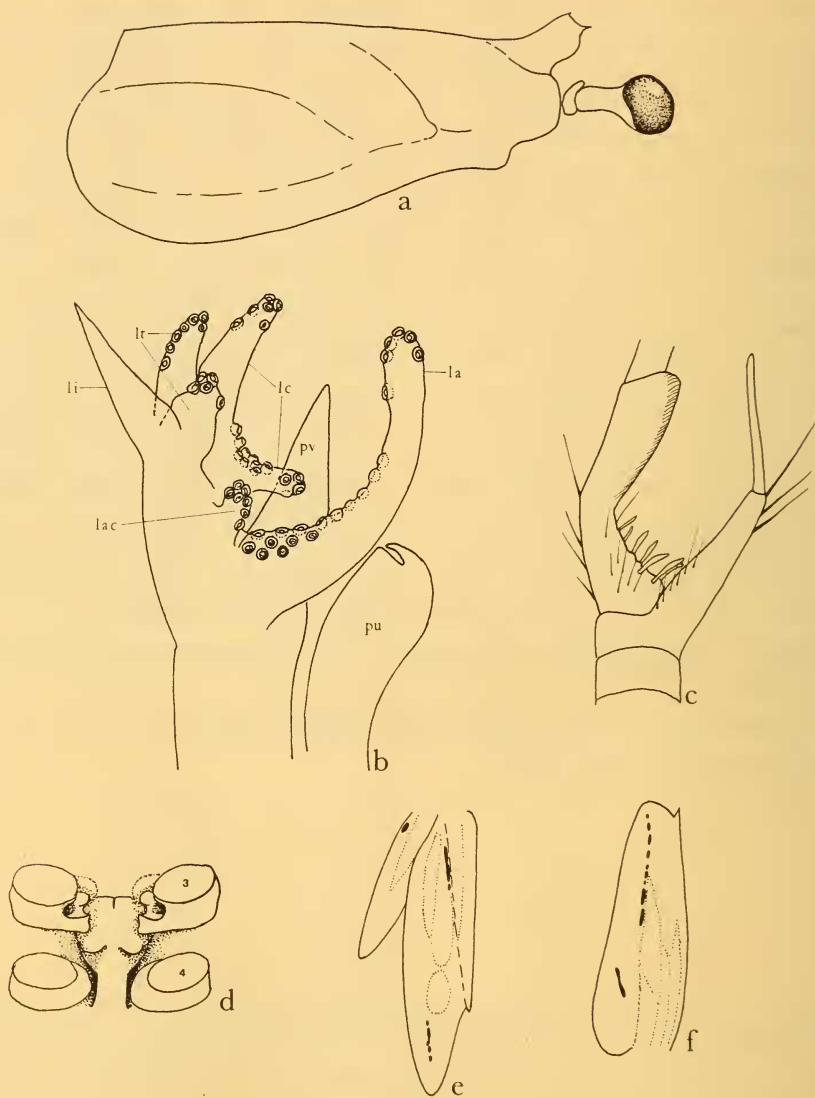
Distribution: 11°18S, 50°03E. (Off northern coast of Malagasy Republic, *Dana* stations 933 1.)

South African stations: A1892, A2961, A2962, A2966, A4218.

Material: Carapace length (mm)

♂	♀
5.6	7.9
6.0	8.2
6.7	8.2
9.0	9.0
	9.7

Remarks: The petasma of the present species closely resembles that of *S. bisulcatus* Wood-Mason, but differs in having a much shorter lobus inermis, and a more strongly curved lobus armatus. The present specimens also differ from *S. bisulcatus* in the shape of the rostrum. In the latter species it is elongate and apically very acute, whereas the present specimens have a short blunt rounded rostrum. Burkenroad (1940), when discussing the affinities of *S. laminatus*, noted that it was most closely related to *S. japonicus* and *S. kroyeri*. The present specimens differ from *S. japonicus* mainly in the shape of the processus ventralis of the petasma, which is not broad and leaf-shaped in the latter. The carapace, and

FIG. 19. *Sergestes (Sergia) potens*

a. Carapace in lateral view; b. Petasma; c. Male outer antennular flagellum;
d. Female coxae pereiopod three; e. Uropod; f. Scaphocerite.

particularly the rostral shape, is very similar. *S. laminatus* differs from *S. kroyeri* Bate in the petasma which in the latter has a long lobus inermis, a bilobed lobus armatus, and a slender processus ventralis.

The *Dana* material of this species came from off the northern coast of the Malagasy Republic. The present records, being both southern Atlantic and south-west Indian Ocean, are thus considerable extensions of the known range.

Sergestes (Sergia) potens Burkenroad, 1940

Fig. 19

Sergestes potens Burkenroad, 1940: 48.

Sergestes (Sergia) potens: Yaldwyn, 1957: 15, figs 11-19.

Sergestes phorcus (non Faxon) Barnard, 1950: 641, fig. 120e-g. Grindley & Penrith, 1965: 281.

Sergestes bisulcatus (non Wood-Mason) Stebbing, 1905: 87, pl. 24a; 1910: 381.

Sergestes grandis (non Sund) Hansen, 1925: 23.

Description: Rostrum apically acute, separated by a short straight portion from a dorsal (occasionally two) denticle. No supraorbital spine or ridge; no hepatic spine, but a blunt knob. Cervical groove laterally distinct, dorsally obsolete. Strong suprabranchial ridge present. Eye slightly more than half length basal antennular peduncle segment. Scaphocerite reaching midpoint of third peduncle segment, bearing row of opaque spot photophores. Sixth abdominal segment longer than telson, ending dorsally in tiny spinule. Maxilliped three slender, shorter than pereopods two or three, reaching slightly beyond antennular peduncle. Pereiopod five half length of four, flattened, two distal segments setose on both margins. Coxa pereiopod three in female produced medially into two blunt lobes, sternum with two bulbous swellings. Petasma in male with long curved proximally and distally armed lobus armatus, with a short lobus accessorius at its base. Lobus connectens bilobed, two lobes forming a crescent, both armed with hooks. Lobus terminalis bilobed, outer lobe longer, both armed distally with hooks. Lobus inermis tapering, unarmed, apically acute. Processus ventralis acutely triangular, unarmed.

Distribution: Eastern Pacific, off New Zealand, off Cape Point.

South African stations: PF16641, IK6, IK14, IK18, IK33, IK36, IK40, IK44, IK46, A2948, A2953, A2968, A4218.

Material: Average carapace length 12 ♂♂: 23.5 mm. Average carapace length 18 ♀♀: 21.9 mm.

Sergestes (Sergia) prehensilis Bate, 1881

Fig. 20

Sergestes prehensilis Bate, 1881: 193; 1888: 385, pl. 71. Hansen, 1903: 56, pl. 11, fig. 4. Gordon, 1935: 314, fig. 1a, 3b, 6c, d, 8a, b, c, 9a, b, c, d.

Sergestes (Sergia) prehensilis: Yaldwyn, 1957: 9. Kensley, 1968: 308; 1969: 154.

Sergestes gloriosus Stebbing, 1905: 84, pls 22, 23; 1910: 381. Hansen, 1925: 24. Barnard, 1950: 642, fig. 120h, i, j. Grindley & Penrith, 1965: 281.

Description: Rostrum apically acute, occasionally with tiny dorsal denticle, no supraorbital spine or ridge. No hepatic spine present, but blunt knob. Cervical

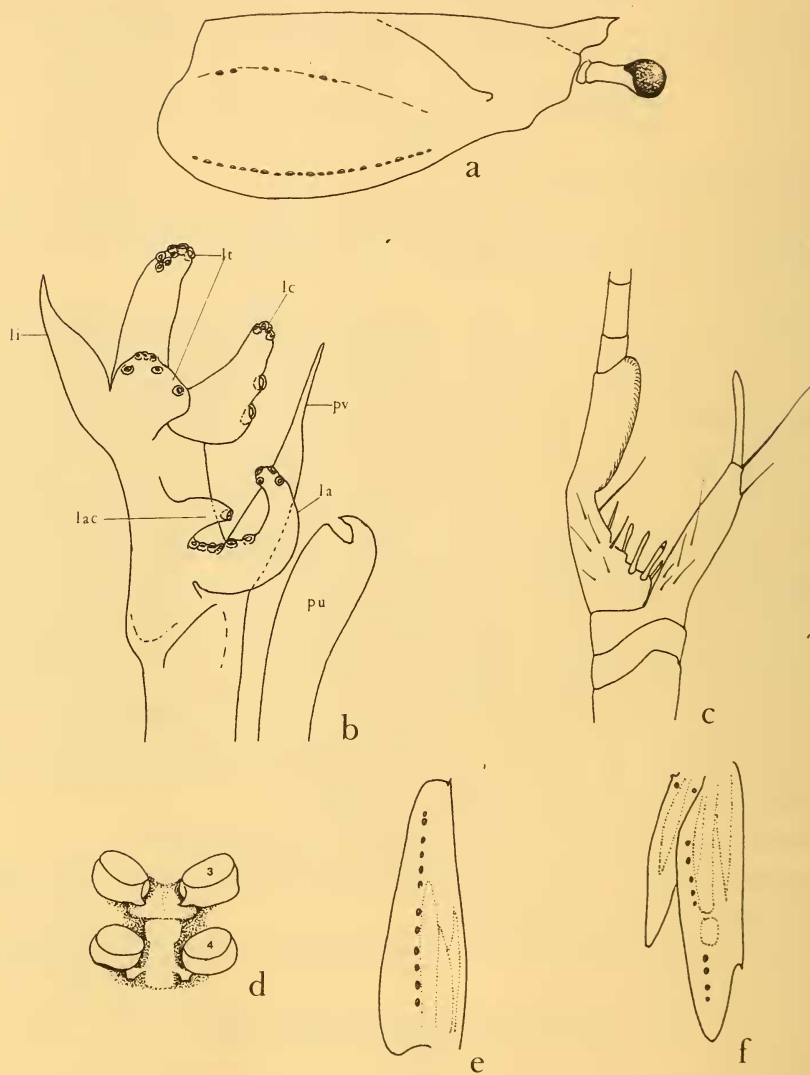


FIG. 20. *Sergestes (Sergia) prehensilis*
 a. Carapace in lateral view; b. Petasma; c. Outer antennular flagellum male;
 d. Female coxae pereiopod three; e. Scaphocerite; f. Uropod.

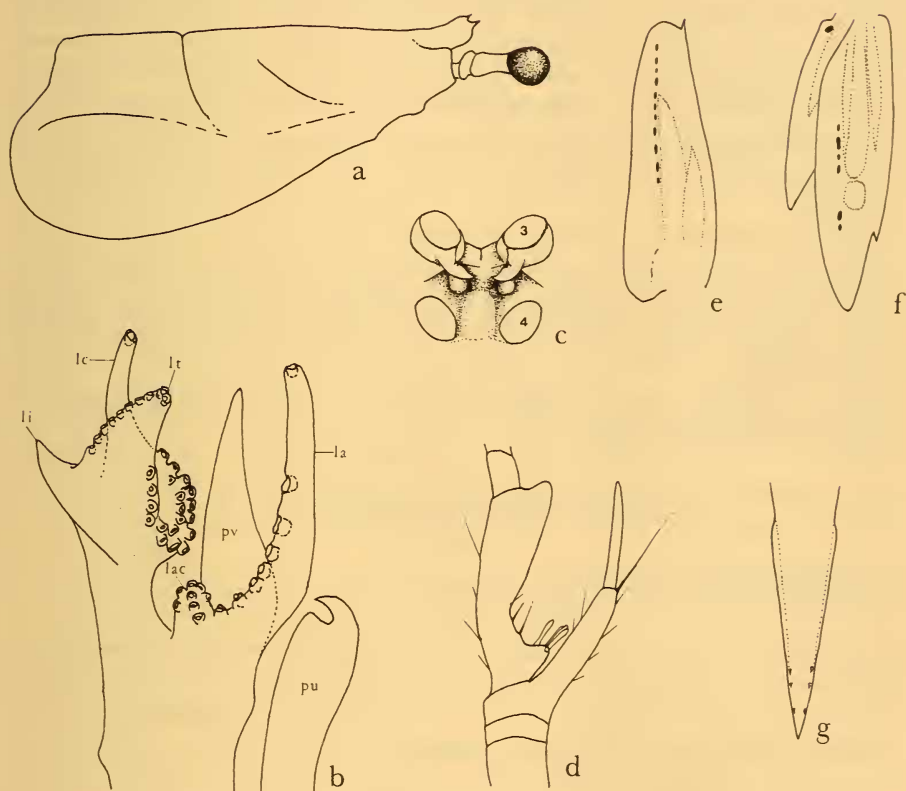


FIG. 21. *Sergestes (Sergia) regalis*
 a. Carapace in lateral view; b. Petasma; c. Female coxae pereopod three;
 d. Male outer antennular flagellum; e. Scaphocerite; f. Uropod; g. Telson.

groove well defined. Carapace with row of 18–22 lens-bearing photophores near lower carapace border, five or six in row at upper border of branchial chamber. Sixth abdominal segment ending dorsally in tiny spinule. Telson apically acute. Eye slightly more than half length of basal antennular peduncle segment. Scaphocerite reaching almost to end of third antennular peduncle segment, bearing row of about 12 or 13 photophores. Third maxilliped slender, shorter than pereopods. Pereiopod five half length of fourth, flattened, two distal segments setose on both margins. Outer margin of exopod uropod with spine at distal third, bearing row of about nine photophores. Coxa pereiopod three in female bearing short broad acute protuberance. Petasma male, with curved lobus armatus, short lobus accessorius at base of latter, lobus inermis tapering, unarmed, apically acute. Lobus terminalis bilobed, outer lobe elongate, with several apical hooks, inner lobe short, blunt. Lobus connectens slightly curved, apically and proximally armed. Processus ventralis apically slender and elongate.

Distribution: Off Japan, off Natal, off Cape.

South African stations: IK7, IK31, IK32, IK33, IK35, IK34, IK36, IK37, IK38, IK41, IK42, IK44, IK45, IK46, IK48, IK51, A315, A317, A318, A321, A1892, A1896, A2945, A2961, A2962, A2963, A2965, A2966, A2968, A3634, A363?, A4218.

Material: Average carapace length for 30 ♂♂: 13.3 mm. Average carapace length for 30 ♀♀: 12.8 mm.

Sergestes (Sergia) regalis Gordon, 1939

Fig. 21

Sergestes regalis Gordon, 1939: 498, figs 1, 2, 3, 4a, b, d.

Sergestes (Sergia) regalis: Yaldwyn, 1957: 9. Kensley, 1968: 308, figs 9b, 10a, 11a.

Description: Rostrum apically bifid. Carapace with well-defined post-cervical groove, cervical groove less well defined, dorsally obsolete. Strong supraorbital ridge. Eye two-thirds length of basal antennular peduncle segment. No ocular tubercle. Sixth abdominal segment longer than telson, ending posteriorly in dorsal spinule. Telson bearing three pairs dorso-lateral spinules distally, apically acute. Scaphocerite not quite reaching middle of third antennular peduncle segment bearing row of about 11 opaque-spot photophores. Maxilliped three slender, shorter than pereopods two or three, reaching end of antennular peduncle, dactylus of six segments, propodus of two. Pereiopods four and five flattened, two distal segments of latter setose on both margins. Coxa pereiopod three female with strong incurved leaf-shaped process. Petasma male with short acute unarmed lobus inermis, lobus terminalis broadly triangular, armed with row of hooks on inner upper edge, shorter than lobus connectens. Latter proximally broad, with numerous large hooks, distally slender, with one large apical hook. Lobus armatus curved, elongate, with small hook-covered lobe at base, slightly longer than unarmed processus ventralis.

Distribution: South Atlantic, 32°45'S, 08°47'W, off Cape Point.

South African stations: IK35, IK40, IK45, IK48, A2958, A3641, A3643, A363?

Material: Average carapace length for 15 ♂♂: 16.2 mm. Average carapace length for 13 ♀♀: 17.6 mm.

Sergestes (Sergia) scintillans Burkenroad, 1940

Fig. 22

Sergestes (Sergia) scintillans Burkenroad, 1940: 43. Yaldwyn, 1957: 9.

Description: Rostrum hardly elevated, apically acute, anterior margin vertical. No supraorbital ridge or spine. Cervical groove dorsally obsolete, laterally more distinct. Post-cervical groove dorsally distinct. Eye reaching middle of basal segment of antennular peduncle. Latter with two distal segments together equal in length to basal segment. Scaphocerite reaching midpoint of third peduncle segment. Maxilliped three slender, not longer or more robust than pereopods. Outer uropod ramus with spine on outer margin at about distal third. Telson apically acutely rounded. Coxa pereopod three in female with strong median curved process. Petasma in male with short triangular processus ventralis, less than half length of robust slightly curved lobus armatus. Latter bearing several large hooks plus row of several smaller hooks. Lobus terminalis small bearing two hooks, applied to base of stout lobus connectens. Latter with eight hooks. Lobus inermis broadly, bluntly rounded, unarmed, widely separated from lobus connectens. Lens-bearing photophore pattern as follows:

Eyestalk—with one distal and one proximal photophore on medial surface.

Antennule—third peduncular segment with single disto-ventral photophore.

Antennal scaphocerite—with row of seven widely separated photophores.

Mandible—one distally on basal joint of palp.

Second maxilla—one on exopod base.

First maxilliped—two on exopod, sternite with one at base of each appendage.

Second maxilliped—one at distal end propodus, one at distal and one at proximal end carpus, one at proximal end merus, one at distal end ischium.

Sternite with one median photophore.

Third maxilliped—one at distal end carpus, one at distal end merus, one at distal end ischium. Sternite with one median photophore one lateral just posterior to appendage.

First pereopod—one at distal and proximal end carpus, one at proximal end merus. Sternite as for maxilliped three.

Second pereopod—one at distal end carpus, one at distal and proximal end merus. Sternite as for maxilliped three.

Third pereopod—similar to second pereopod.

Fourth pereopod—similar to second pereopod.

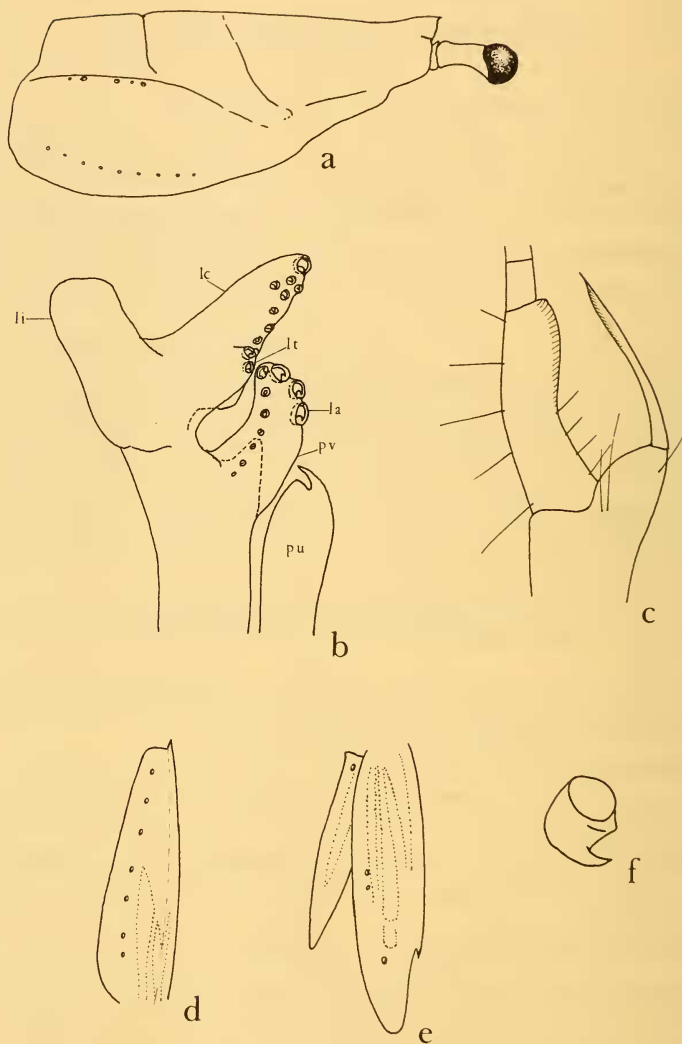


FIG. 22. *Sergestes (Sergia) scintillans*
a. Carapace in lateral view; *b.* Petasma; *c.* Male outer antennular flagellum;
d. Scaphocerite; *e.* Uropod; *f.* Female coxa pereopod three.

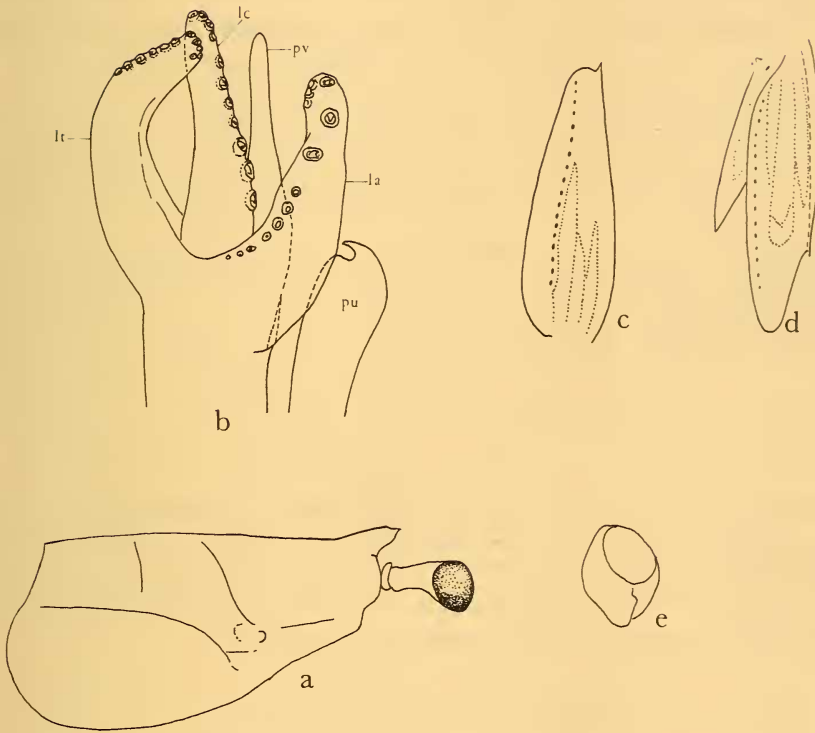


FIG. 23. *Sergestes (Sergia) splendens*
 a. Carapace in lateral view; b. Petasma; c. Scaphocerite; d. Uropod;
 e. Female coxa pereopod three.

Fifth pereopod—one at distal end merus, one at distal end ischium.
Sternite with one median pair posterior to appendages, one lateral posterior to median pair.

Branchiostegite—with row of five minute photophores along supra-branchial ridge, lower portion with row of nine minute photophores.

Pleopods—with single minute photophore on inner distal end protopodite, between endo- and exopod.

First pleon sternite—one postero-median, one antero-lateral to pleopod, one medio-lateral to pleopod.

Second to fourth pleon sternites—one antero-median, one postero-median, one antero-lateral, one medio-lateral to pleopod.

Fifth pleon sternite—one antero-lateral to pleopod.

Sixth pleon sternite—four or five median photophores.

Uropod—protopodite with two on inner margin, outer ramus with three widely separated photophores, inner ramus with two basal photophores.

Distribution: 00°55'S, 98°15'E. (Off western Sumatra, *Dana* station 3622 1.)

South African stations: IK46, A1896, A2966.

Material: Carapace length (mm)

♂	♀
6.9	6.8
6.8	8.8
5.8	

Remarks: The specimens fit the description given by Burkenroad, especially in the photophores pattern, and also agree with the type material. The only differences are in the branchiostegite photophores, there being 12 in the holotype, nine in the present specimens, and in the fourth pleon sternite which, unlike the holotype, does have two median photophores.

Sergestes (Sergia) splendens Sund, 1920

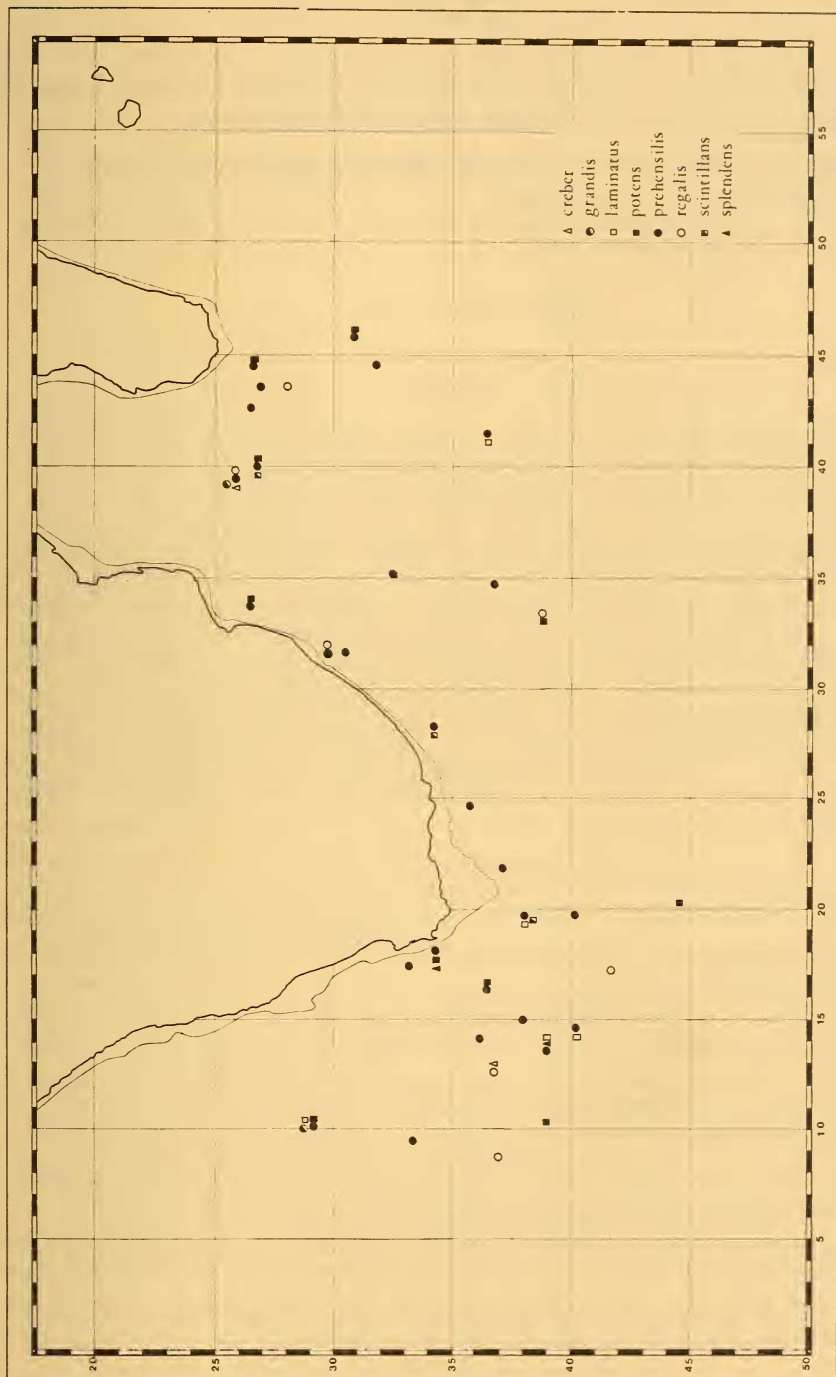
Fig. 23

Sergestes splendens Sund, 1920: 14, figs 16–18. Barnard, 1950: 642, fig. 120k, l. Grindley & Penrith, 1965: 281.

Sergestes (Sergia) splendens: Yaldwyn, 1957: 9.

Sergestes crassus Hansen, 1922: 98, pl. 5, figs 4a–l, 1925: 23.

Description: Rostrum ovate, apically acute. No supraorbital spine or ridge. No hepatic spine but a small knob present. Cervical groove dorsally obsolete, laterally defined. Strong post-cervical groove. Eyestalk reaching midpoint of basal antennular peduncle segment, bearing an ocular tubercle at disto-dorsal edge of cornea. Antennular peduncle squat, basal segment longer than second, which in turn is longer than third. Scaphocerite reaching midpoint of latter, bearing row of about 18 opaque spot photophores. Telson apically acute. Uropod exopod with spine on outer margin at distal third, with row of about


 FIG. 24. Map showing distribution of the subgenus *Sergia* around southern Africa

15 minute photophores close to inner margin. Coxa pereopod three in female with broad rounded median process. Petasma in male with four elongate lobes. Lobus armatus slightly curved, armed with a single row of hooks. Lobus terminalis curved, not reaching as far distally as lobus connectens. Processus ventralis slender, unarmed, equal in length to lobus terminalis.

Distribution: North Atlantic, Mediterranean (off Monaco), off Table Bay.

South African stations: A2962, IK6.

Material: Carapace length (mm)

♂	♀
11.3	10.6

DISCUSSION

Regarding the genus *Lucifer*, it may be seen from the distribution map (Fig. 3) that *L. typus*, the commonest species in South African waters, and here recorded for the first time, occurs both inshore as well as in the very deep offshore oceanic water. *L. penicillifer*, the other common species (and the only species hitherto recorded from South Africa), seems more confined to the inshore waters. A similar situation has been observed off the coast of Florida (Bowman & McCain, 1969) where *L. typus* did not seem to occur inside the 100 fathoms line, whereas *L. faxoni* tended to be absent from the offshore stations. Although the situation obtaining off the southern African coast is not as clear-cut, probably due to a more complex current system, a similar trend is apparent. Of the other two species of *Lucifer* recorded, viz. *L. chacei* and *L. orientalis*, both are new records for the area. *L. orientalis* occurred at both inshore and offshore stations, but only off the east coast, i.e. confined to the warmer Indian Ocean water. *L. chacei* was taken at only two stations, at the southern end of the Moçambique Channel. This is not unexpected as this species is common in the East Indies (Hansen, 1919). Nevertheless, this is the most westerly record of the species, and an extension of the known range by several thousand miles.

With regard to the genus *Sergestes*, it can be seen from the distribution maps (Figs 15, 24) that several species occur which are typical of the oceans either to the west or to the east of the southern African continent. *S. splendens* seems to be limited to the Atlantic and Mediterranean, and has not been taken east of Cape Point. Six species have been recorded from the North Atlantic and are now recorded both from west of Cape Point (South Atlantic) and east of Cape Point (south-west Indian Ocean). These are *S. corniculum*, *atlanticus*, *arcticus*, *armatus*, *sargassi*, *pectinatus*. Two eastern Indian Ocean species, viz. *laminatus* and *scintillans* have their ranges extended by several thousand miles to the south-west Indian Ocean, while *S. creber* from the western Pacific is now recorded from the Moçambique Channel and south-west of Cape Point. *S. disjunctus*, also from the western Pacific, is now recorded from off the west coast.

SUMMARY

The family Sergestidae in the waters around southern Africa is reviewed. Four species of the planktonic genus *Lucifer* are discussed, three of which are new records for the region. Two species of *Acetes* are discussed, while the first record of *Petalidium foliaceum* is made. Eight species of *Sergestes*, subgenus *Sergestes*, are discussed, three of which are new records, while of the eight species of the subgenus *Sergia* discussed, four are new records for the region.

ACKNOWLEDGEMENTS

My grateful thanks are due to the following scientists for allowing me to examine the South African material: The Director of the Division of Sea Fisheries, Cape Town; Dr. J. R. Grindley and Mr. M. J. Penrith for material collected while they were both attached to the South African Museum, Cape Town; Mr. P. Zoutendyk of the Oceanography Department, University of Cape Town. My thanks are also due to Dr. Torben Wolff of the Universitetets Zoologiska Museum, Copenhagen, for allowing me to examine material of *S. grandis* and type material of *S. orientalis*; and to Dr. E. Bertelsen of Denmark, and Dr. A. A. Racek of Sydney, Australia, for making the *Dana* Expedition types of *S. creber*, *S. disjunctus*, *S. laminatus* and *S. scintillans* available to me.

Finally, my sincere thanks are due to Dr. F. A. Chace, Jr., of the Smithsonian Institution, Washington, D.C., and Dr. J. C. Yaldwyn, of the Dominion Museum, Wellington, New Zealand, for their critical reading of the manuscript, and for supplying many useful suggestions and opinions.

REFERENCES

- BARNARD, K. H. 1950. Descriptive catalogue of South African decapod Crustacea (crabs and shrimps). *Ann. S. Afr. Mus.* **38**: 1-837.
- BARNARD, K. H. 1955. Additions to the fauna-list of South African Crustacea and Pycnogonida. *Ann. S. Afr. Mus.* **43**: 1-107.
- BATE, C. S. 1881. On the Penaeidea. *Ann. Mag. nat. Hist.* (5) **8**: 169-196.
- BATE, C. S. 1888. Report on the Crustacea Macrura collected by H.M.S. *Challenger* during the years 1873-1876. *Rep. Voy. Challenger 1873-76* **24**: 1-942.
- BOWMAN, T. E. 1967. The planktonic shrimp *Lucifer chacei* sp. nov. (Sergestidae: Luciferinae), the Pacific twin of the Atlantic *Lucifer faxoni*. *Pacif. Sci.* **21**: 266-271.
- BOWMAN, T. E. & MCCAIN, J. C. 1967. Distribution of the planktonic shrimp, *Lucifer*, in the western North Atlantic. *Bull. mar. Sci.* **17**: 660-671.
- BURKENROAD, M. D. 1937. The Templeton Crocker Expedition. XII. Sergestidae (Crustacea Decapoda) from the Lower Californian region, with descriptions of two new species and some remarks on the organs of Pesta in *Sergestes*. *Zoologica N.Y.* **22**: 315-330.
- BURKENROAD, M. D. 1940. Preliminary descriptions of twenty-one new species of pelagic Penaeidea (Crustacea Decapoda) from the Danish Oceanographical Expeditions. *Ann. Mag. nat. Hist.* (11) **6**: 35-54.
- CHACE, F. A. 1955. Notes on shrimps from the Marshall Islands. *Pacif. Sci.* **21**: 266-271.
- EDWARDS, H. M. 1830. Descriptions des genres Glaucothoë, Sicyonia, Sergestes et Acète de l'ordre des crustacés décapodes. *Annls Sci. nat. (Zool)* **19**: 333-352.
- EDWARDS, H. M. 1837. *Histoire naturelle des crustacés*. 2 Paris: Roret.

- GORDON, I. 1935. On new or imperfectly known species of Crustacea Macrura. *J. Linn. Soc. Lond. (Zool)* **39**: 307-351.
- GORDON, I. 1939. A new species of *Sergestes* (Crustacea, Decapoda) from the South Atlantic. *Ann. Mag. nat. Hist.* (11) **4**: 498-509.
- GORDON, I. 1956. The Sergestidae of the Great Barrier Reef Expedition. *Sci. Rep. Gr. Barrier Reef Exped.* **6**: 323-333.
- GRINDLEY, J. R. & PENRITH, M. J. 1965. Notes on the bathypelagic fauna of the seas around South Africa. *Zool. afr.* **1**: 275-295.
- HALE, H. M. 1941. Decapod Crustacea. *Rep. B.A.N.Z. antarct. Res. Exped.* (B) **4**: 257-285.
- HANSEN, H. J. 1896. On the development and the species of the crustaceans of the genus *Sergestes*. *Proc. zool. Soc. Lond.* **1896**: 936-970.
- HANSEN, H. J. 1903. On the crustaceans of the genera *Petalidium* and *Sergestes* from the 'Challenger', with an account of luminous organs in *Sergestes challengerii*, n. sp. *Proc. zool. Soc. Lond.* **1903**: 52-79.
- HANSEN, H. J. 1919. The Sergestidae of the Siboga Expedition. *Siboga Exped. monogr.* **38**: 1-65.
- HANSEN, H. J. 1922. Crustacés décapodes (Sergestides) provenant des campagnes des yachts *Hirondelle* et *Princesse-Alice* (1885-1915). *Résult. Camp. scient. Prince Albert I* **64**: 1-232.
- HANSEN, H. J. 1925. Note on specimens of the genus *Sergestes*. In CALMAN, W. T. On macrurous decapod Crustacea collected in South African waters by the S.S. 'Pickle'. *Rep. Fish. mar. biol. Surv. Un. S. Afr.* **4**: 22-26.
- HOLTHUIS, L. B. 1952. The Crustacea Decapoda Macrura of Chile. *Acta Univ. lund.* (N.F., Avd. 2) **47** (10): 1-109.
- ILLIG, G. 1914. Die Dekapoden der Deutschen Südpolar-Expedition 1901-1903. II. Die Sergestiden. *Dt. Südpol.-Exped.* **15**: 349-376.
- KEMP, S. 1910. The Decapoda Natantia of the coasts of Ireland. *Scient. Invest. Fish. Brch Ire.* **1908** (1) 1-190.
- KEMP, S. 1917. Notes on Crustacea Decapoda in the Indian Museum. VIII. The genus *Acetes*, Milne Edwards. *Rec. Indian Mus.* **13**: 43-58.
- KENSLEY, B. F. 1968. Deep sea decapod Crustacea from west of Cape Point, South Africa. *Ann. S. Afr. Mus.* **50**: 283-323.
- KRÖYER, H. 1855. Bidrag til kundskab om krebsdyrslægten *Sergestes* Edw. *Overs. K. danske Vidensk. Selsk. Forh.* **1855**: 22-34.
- KRÖYER, H. 1859. Forsøg til en monographisk fremstilling af kraebdyrslægten *Sergestes*. Med bemaerkninger om dekapodernes høreredskaaber. *K. danske Vidensk. Selsk. Skr.* **4**: 217-304.
- MILNE, D. S. 1968. *Sergestes similis* Hansen and *S. consobrinus* n. sp. (Decapoda) from the north-eastern Pacific. *Crustaceana* **14**: 21-34.
- MILNE EDWARDS, H. See EDWARDS, H. M.
- NOBILI, G. 1905. Diagnoses préliminaires de 34 espèces et variétés nouvelles, et de 2 genres nouveaux de décapodes de la Mer Rouge. *Bull. Mus. natn. Hist. nat., Paris* **1905**: 393-411.
- NOBILI, G. 1906. Faune carcinologique de la Mer Rouge. Décapodes et stomatopodes. *Annls Sci. nat. (Zool)* **4**: 1-347.
- ORTMANN, A. 1893. Decapoden und Schizopoden. *Ergebn. Atlant. Planktonexped.* **2** (G.b.): 1-120.
- SMITH, S. I. 1887. Report on the decapod Crustacea of the 'Albatross' dredgings off the east coast of the United States during the summer and autumn of 1884. *Rep. U.S. Commnr Fish.* **1885**: 605-705.
- STEBBING, T. R. R. 1905. South African Crustacea. Part III. *Mar. Invest. S. Afr.* **4**: 21-120.
- STEBBING, T. R. R. 1910. General catalogue of South African Crustacea. *Ann. S. Afr. Mus.* **6**: 281-593.
- STEBBING, T. R. R. 1914a. South African Crustacea. *Ann. S. Afr. Mus.* **15**: 1-55.
- STEBBING, T. R. R. 1914b. Stalk-eyed Crustacea Malacostraca of the Scottish National Antarctic Expedition. *Trans. R. Soc. Edinb.* **50**: 253-307.
- SUND, O. 1920. Peneides and Stenopides from the 'Michael Sars' North Atlantic Deep-sea Expedition. *Rep. scient. Results Michael Sars N. Atlant. Deep Sea Exped.* **3** (7): 1-32.
- YALDWYN, J. C. 1957. Deep-water Crustacea of the genus *Sergestes* (Decapoda, Natantia) from Cook Strait, New Zealand. *Zoology Publs Vict. Univ. Coll.* **22**: 1-27.